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THE UNITED STATES AND OUTER SPACE

(Final) → REPORT

OF THE

SELECT COMMITTEE

ON

ASTRONAUTICS AND SPACE EXPLORATION

'McCormack Committee'

Oct 1957
Jan 1959

Missile + Space Chronology

JANUARY 3, 1959.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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SELECT COMMITTEE ON ASTRONAUTICS AND SPACE EXPLORATION

(Created by H. Res. 496, March 5, 1958, 85th Cong.)

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LETTER OF TRANSMITTAL

House of Representatives,
Washington, D.C., January 3, 1959.

Hon. Sam Rayburn,
Speaker of the House of Representatives,
Washington, D.C.

Dear Mr. Speaker: By direction of the Select Committee on Astronautics and Space Exploration, I submit herewith the committee's final report to the 85th Congress.

This letter would not be complete without reference to the dedication shown by every member of the committee in extensive and continuing participation in all the activities undertaken by the committee in pursuit of its duties. The spirit of complete cooperation and unanimity in so serious and so new a matter as space development is almost without parallel. I express my heartfelt thanks for what they have done, and for the helpful and loyal service to all of us rendered by the staff.

John W. McCormack,
Chairman.

PERMANENT ASSIGNMENTS OF MEMBERS OF THE SELECT COMMITTEE ON ASTRONAUTICS AND SPACE EXPLORATION

John W. McCormack, Chairman	Majority leader. Committee on Government Operations.
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Brooks Hays	Committee on Foreign Affairs.
Leo W. O'Brien	Committee on Interior and Insular Affairs. Committee on Interstate and Foreign Commerce.
Lee Metcalf	Committee on Education and Labor. Committee on Interior and Insular Affairs.
William H. Natcher	Committee on Appropriations.
B. F. Sisk	Committee on Interior and Insular Affairs. Committee on Veterans' Affairs.
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Gordon L. McDonough	Committee on Banking and Currency. Joint Committee on Defense Production.
James G. Fulton	Committee on Foreign Affairs.
Kenneth B. Keating	Committee on the Judiciary. Joint Committee on Immigration and Nationality Policy.
Gerald R. Ford	Committee on Appropriations.

APPENDIX

CHRONOLOGY

The report of this committee entitled The National Space Program (H. Rept. No. 1758, May 21, 1958) contained a chronology running from 1948 to mid-May 1958. The notes which follow are somewhat similarly arranged, and cover the time from October 1957 through December 1958.

1957

October 4: The Soviet Union launched the first Earth satellite, Sputnik I. Spherical in shape, it weighed 184 pounds and was 22.8 inches in diameter. Four whip antennas 7 feet 10.5 inches to 9 feet 6 inches in length protruded from the satellite skin which was constructed of aluminum alloys. The satellite carried instruments (their weight was not announced) to measure internal temperatures, pressures "and other data." Two radio transmitters, radiating on frequencies of 20.005 and 40.002 megacycles, were carried; both ceased operating on October 27, 1957. The radios were powered by chemical batteries. The satellite's initial perigee was 142 miles, its apogee 588 miles, and its period 96.17 minutes. It was launched with an inclination to the Equator of 64.3°. The satellite's perigee speed was about 18,000 miles per hour; its speed at apogee was about 16,200 miles per hour. The satellite reentered the atmosphere and presumably disintegrated on January 4, 1958.

October 5: Resolutions of an international conference on rockets and satellites provided for continuation of internationally coordinated research in these fields beyond the International Geophysical Year. Both American and Russian scientists were present at the conference.

October 9: President Eisenhower in a White House press release congratulated the Soviet scientists on Sputnik I. He gave a brief history of the development of the United States satellite program and pointed to the separation of Project Vanguard from work on ballistic missiles.

October 13: Aviation Week reported that Lockheed has been working since 1956 on a project called Pied Piper, or unofficially Big Brother. The report was officially denied. The magazine said the satellite would have television or regular photographic capabilities, and use infrared and radar scanners. Orbits would lie between 300 and 1000 miles.

October 14: The American Rocket Society presented to President Eisenhower a program for outer space development formulated after months of study. It proposed establishment of an Astronautical Research and Development Agency similar to the National Advisory Committee for Aeronautics and the Atomic Energy Commission, which would have responsibility for all space projects except those directly related to the military. The report contained a schedule of proposed space projects and pointed out the benefits which would accrue from them. The annual budget of the agency was estimated at $100 million.

October 16: The United States Air Force fired an Aerobee rocket at Holloman Air Force Base fitted with three shaped charges in the nose. At 35 miles, these were fired, and it is believed that they sent small pellets of a few grams each at speeds sufficiently high that at least two attained escape velocity and left the Earth. Measurements were made by photographing the meteorlike trail.

October 21: Aviation Week revealed that the United States had been monitoring Soviet ballistic missile launchings for over 2 years from a large radar installation near Samsun, Turkey.

October 23: The United States Air Force, as part of Project Farside, launched a sounding rocket from a balloon 100,000 feet over Eniwetok in mid-Pacific. A four-stage rocket of 1,900 pounds was used. Although the attained altitude was first reported as 4,000 miles, this was in doubt, as contact by radio was lost, and the altitude attained may have been about 2,500 miles.

November 3: Sputnik II, carrying a dog, Laika, was launched by the Soviet Union. According to the Tass announcements, the "containers with apparatus" of this rocket-shaped satellite weighed 1,120 pounds, and it contained "instruments for studying solar radiation in the short wave ultraviolet and X-ray regions of the spectrum, instruments for cosmic ray studies, instruments for studying the temperature and pressure, an airtight container with an experimental animal (a dog), an air conditioning system, food and instruments for studying life processes in the conditions of cosmic space, measuring instruments for transmitting the results of scientific measurements to the Earth, two radio transmitters operating on frequencies of 20.005 and 40.002 megacycles, both of which ceased operating on November 10, 1957. The radios were powered by chemical batteries. The satellite's initial perigee was 140 miles, its apogee 1,038 miles, and its period 103.75 minutes. Its inclination to the Equator when launched was 65.4°. Its perigee speed was 18,000 miles per hour; its apogee speed 15,100 miles per hour. The satellite reentered the atmosphere and presumably disintegrated on April 13, 1958.

November 7: President Eisenhower in a radio and television address on science and security announced that scientists had solved the problem of re-entry and showed the nose cone of a missile which was intact after a flight through outer space. He announced the creation of the office of Special Assistant to the President for Science and Technology and the appointment of Dr. James R. Killian, president of the Massachusetts Institute of Technology to the new post.

November 8: Secretary of Defense McElroy directed the Department of the Army to make preparations for launching a satellite with the Jupiter-C test rocket and thus supplement the existing Vanguard program. William M. Holaday, Assistant to the Secretary of Defense for Guided Missiles, was given authority for coordinating this project with the overall satellite program.

November 13: President Eisenhower, in a speech on future security, proposed adoption of a formula for decisions on undertaking space projects, which would include the following criteria:

"If the project is designed solely for scientific purposes, its size and its cost must be tailored to the scientific job it is going to do."

"If the project has some ultimate defense value, its urgency for this purpose is to be judged in comparison with the probable value of competing defense projects."

November 15: William M. Holaday, special assistant to the Secretary of Defense, was named Director of Guided Missiles by Secretary of Defense McElroy. Under terms of the Defense Department directive: "The Director of Guided Missiles will direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles." In his press conference Secretary McElroy disclosed that the Department of Defense was thinking of establishing a centralized organization which would handle both outer space and anti-missile-missile projects.

November 21: The Rocket and Satellite Research Panel proposed the creation of a National Space Establishment in the executive branch of the Government. Under civilian leadership but cognizant of defense requirements, this establishment would carry out a unified program of space research in its own facilities and by contract. An annual budget of $1 billion for ten years was recommended.

—— The board of directors of the National Advisory Committee for Aeronautics authorized establishment of a special committee on space technology. This committee would both supervise and help formulate a space research program and would be assisted by specialized subcommittees.

November 25: The Preparedness Investigating Subcommittee of the Senate Committee on Armed Services began extensive hearings on the Nation's satellite and missile programs. Approximately 70 experts appeared before the Subcommittee during the course of these hearings, and written testimony was submitted by about 200 others.

December 4: The American Rocket Society's proposal for an Astronautical Research and Development Agency, which was presented to President Eisenhower on October 14, 1957, was announced. Commander Robert C. Truax, president of the Society, stated that he felt $100,000,000 a year would be required at first for the astronautical agency.

December 5: The Advanced Research Projects Agency, ARPA, is to be created in the Department of Defense to direct Defense space projects.

December 6: A mechanical failure in the propulsion system of the Vanguard rocket, TV3, caused it to burst into flames two seconds after it was fired in an attempt by the Navy to launch a 6.4 inch, 3.25 pound, test satellite.

December 10: A Directorate of Astronautics was established by the Air Force to manage and coordinate astronautical research programs, including work on satellites and anti-missile weapons. Brig. Gen. Homer Boushey was named to head the board.

December 13: The order creating a Directorate of Astronautics was suspended by William H. Douglas, Secretary of the Air Force, as creation of such a group before establishment of the proposed Advanced Research Projects Agency was felt to be premature.

December 14: Maj. Gen. John B. Medaris, Commander of the Army Ballistic Missile Agency, in testifying before the Senate Preparedness Investigating Subcommittee stated: "Because I have no responsibility to carry this out, I think I can say in open meeting that it is my personal opinion unless this country can command 1 million pounds of thrust by 1961, we will not be in space * * * we will not be in the race."

December 24: The Soviet Union reported that a dog, Albina, had twice ridden in rockets, most recently parachuting safely after an ascent to 125 miles.

1958

January 4: Sputnik I disintegrated.

——— The American Rocket Society and the Rocket and Satellite Research Panel issued a summary of their proposals for a National Space Establishment. Preferably independent of the Department of Defense, but in any event not under one of the military services, this establishment would be responsible for the "broad cultural, scientific, and commercial objectives" of outer space development. A timetable of the achievements necessary for attaining United States leadership in space technology was included in the document.

January 9: In his State of the Union Message, President Eisenhower reported: "In recognition of the need for single control in some of our most advanced development projects, the Secretary of Defense has already decided to concentrate into one organization all antimissile and satellite technology undertaken within the Department of Defense."

January 12: President Eisenhower, in answering the December 10, 1957, letter of Soviet Premier Nikolai A. Bulganin regarding a summit conference and disarmament, proposed that the Soviet Union and the United States "agree that outer space should be used only for peaceful purposes." This proposal was compared with the 1946 offer of the United States to cease production of nuclear weapons and dedicate atomic energy to peaceful uses, an offer which was not accepted by the Soviet Union.

——— James H. Doolittle, chairman of the National Advisory Committee for Aeronautics, announced the authorization of a special committee on space technology on November 21, 1957. Dr. H. Guyford Stever was to head the committee.

January 13: In his Budget Message to Congress, President Eisenhower stated that in his request: "Funds are provided for an expanded research and development effort on military satellites and other outer space vehicles and on antimissile missile systems, to be carried out directly under the Secretary of Defense." The budget for fiscal year 1959 showed that $340,000,000 in new obligational authority was being asked for the Advanced Research Projects Agency. No new authorizations were sought for the International Geophysical Year, but estimated obligations for earth satellite exploration of the upper atmosphere under this program were $8,139,834 for the fiscal year 1958 and $21,000,000 for fiscal year 1959.

——— Secretary of Defense Neil H. McElroy, in testifying before the House Armed Services Committee, stated:

"Such long-range programs as the antimissile missile and the military satellite programs are in the research and exploratory development stages. They are important and must be pursued, but they must not distract us from the speedy development of our other missile systems. To handle them, I am establishing within the Department of Defense an Advanced Research Projects Agency, which will be responsible to the Secretary of Defense for the unified direction and management of the antimissile missile program and for outer space projects. I would expect to assign other special projects of this general nature to this agency from time to time in the future."

January 14: Censored Air Force testimony made public that a reconnaissance satellite with a recoverable capsule was expected to be launched in the spring of 1959, with a Thor-launched test vehicle by October 1958. Purposes of the capsule were not officially revealed.

——— Senator Lyndon B. Johnson in an address before Columbia Broadcasting System affiliates in Washington, D. C., urged the United States "to demonstrate its initiative before the United Nations by inviting all member nations to join in this adventure into outer space together." Growth of America's space research program and establishment of a government agency for its direction were also demanded by Johnson as part of the Nation's answer to the Soviet challenge.

January 16: Representative Carl T. Durham, chairman of the Joint Committee on Atomic Energy, announced the establishment of a Special Subcommittee on Outer Space Propulsion with Senator Clinton P. Anderson as chairman.

January 22: Nikita S. Khrushchev in a speech at Minsk, Byelorussia, stated that the Eisenhower proposal to dedicate outer space to peaceful purposes was an attempt of the United States to ban weapons it did not possess and to protect itself from those weapons which would harm its own territory.

January 23: Membership of the Special Subcommittee on Outer Space Propulsion of the Joint Committee on Atomic Energy was announced:

Senators: Clinton P. Anderson, chairman, Henry M. Jackson, Albert Gore, Bourke B. Hickenlooper, John W. Bricker.

Representatives: Chet Holifield, Melvin Price, James E. Van Zandt, James T. Patterson.

——— Senator Clinton P. Anderson in a speech before Congress explaining his bill, S. 3117, proposed that control of the Nation's outer space program for the "peaceful conquest of space" be given to the Atomic Energy Commission. He stressed that such a decision would save needed time and would give control to an established civilian agency with extensive laboratories. Senator Anderson pointed out that nuclear propulsion should play an essential part in space technology.

—— Senator Lyndon B. Johnson read a statement unanimously adopted by the Senate Preparedness Investigating Subcommittee at the conclusion of its hearings. Largely concerned with guided-missile development, it stated that the Russian satellite program "demonstrates beyond question that the Soviet Union has the propulsive force to hurl a missile from one continent to another." The American program since the launching of Sputnik I was reviewed, and the report made 17 recommendations for American security, including:

"Start work at once on the development of a rocket motor with a million-pound thrust."

"Accelerate and expand research and development programs, provide funding on a long-term basis, and improve control and administration within the Department of Defense or through the establishment of an independent agency."

January 27: Hugh L. Dryden, Director of the National Advisory Committee for Aeronautics, delivered a speech, Space Technology and the NACA, to the Institute of the Aeronautical Sciences. Stressing the importance of a well-planned and logical space program embracing both civilian and military uses, Dryden pointed to the organization of the NACA for both military and nonmilitary aeronautical research and reviewed the Committee's work in space research since World War II. He related the view expressed by the NACA at its January 16, 1958, meeting that the national space program should be under the joint control of the Department of Defense, the NACA, the National Academy of Sciences, and the National Science Foundation; in addition to research flights, the NACA would "coordinate and conduct research in space technology in its own laboratories and by contract in support of both military and nonmilitary projects."

January 31: The first American satellite, Explorer I, was launched under the IGY program. The launching of these and succeeding Explorer satellites was accomplished by the Army Ballistic Missile Agency and the Jet Propulsion Laboratory of the California Institute of Technology. Cylindrical in shape, the satellite was 80 inches long, 6 inches in diameter, and weighed 30.8 pounds. It was constructed of steel, with eight aluminum oxide stripes painted on its surface to control temperatures. The satellite had 2 antennas: A turnstile type with 4 whip elements each 22.5 inches long and a dipole antenna using the skin of the satellite itself. Instrumentation weighing 10.63 pounds was designed to measure cosmic rays, micrometeors, and temperatures within and on the skin of the satellite. One radio transmitter, operating on a frequency of 108 megacycles at 10 milliwatts of power, telemetered data on cosmic rays, micrometeor erosion, and front-skin and nose-cone temperatures. The second radio transmitter, operating on a frequency of 108.03 megacycles at 60 milliwatts of power, telemetered data on cosmic rays, micrometeor impact, and internal and rear-skin temperatures. The low-power transmitter ceased operating on May 23, 1958. The high-power transmitter first stopped transmitting on February 11, 1958; it began again on February 24, and ceased operating finally on February 28, 1958. The radios were powered by mercury batteries. The satellite's initial perigee was 224 miles, its apogee 1,573 miles, its period 114.8

minutes. It was launched at an inclination to the Equator of 33.5°. Its perigee speed was 18,400, its apogee speed 15,700 miles per hour. The satellite is still in orbit, and is expected to remain there for from 3 to 5 years.

February 1: The Army has proposed a plan for a 500-pound reconnaissance satellite.

February 2: Senator Jackson predicted the United States could launch a Moon rocket with just a few months' preparation.

February 3: The Army reconnaissance plan might run as high as 700 pounds, for a television carrying unit to be launched late in 1958, based on the Jupiter C launching device.

——— Soviet Premier Nikolai A. Bulganin in a letter to President Eisenhower stated that the Soviet Union "is ready to examine also the question of the intercontinental rockets if the Western Powers are willing to reach agreement to ban atomic and hydrogen weapons, to end tests thereof, and to liquidate foreign military bases in other nations' territories. In that case, an agreement on the use of outer space for peaceful purposes only would unquestionably meet no difficulties."

——— Scientists at the California Institute of Technology reported that initial data from Explorer I showed that cosmic radiation on its orbit did not exceed 12 times the amount on earth and thus appeared to pose no great threat to travel in this region. In addition, no positive evidence of encounter with meteoritic particles had been found.

February 4: Republican Congressional leaders were informed that President Eisenhower had directed James R. Killian, Jr., to study and make recommendations on the governmental organization of the Nation's space and missile program.

February 5: The second trial firing of a Vanguard test satellite failed as defects in the first-stage engine control system caused the rocket to veer to the right and break in two about 60 seconds after launching, 4 miles up. The rocket was destroyed by the range safety officer at the Air Force Missile Test Center, Cape Canaveral, Fla. The satellite weighed 3.25 pounds, was 6.4 inches in diameter. The payload included yeast.

February 6: The Senate passed S. Res. 256 by a vote of 78 to 1, creating a Special Committee on Space and Astronautics to frame legislation for a national program of space exploration and development.

February 7: The Advanced Research Projects Agency was established by the Department of Defense, and Roy W. Johnson, a vice president of General Electric Co., was appointed by Secretary of Defense McElroy as its director. ARPA was placed in charge of the Nation's outer space program including the development of military space weapons and was made responsible for antimissile missile projects. William H. Holaday, Director of Guided Missiles, was to transfer responsibilities in these fields to Mr. Johnson.

February 10: The following Senators were named to the Senate Special Committee on Space and Astronautics: Lyndon B. Johnson, Styles Bridges, Richard B. Russell, Leverett Saltonstall, Clinton P. Anderson, Bourke B. Hickenlooper, Theodore Francis Green, Alexander Wiley, John L. McClellan, Karl E. Mundt, Warren G. Magnuson, John W. Bricker, Stuart Symington.

——— Senator Michael J. Mansfield urged the members of the North Atlantic Treaty Organization to take the initiative in exploring space on a cooperative basis. Other nations who wished "to participate in good faith" would be included in this international undertaking. Senator Mansfield also recommended that the United States should propose extending the International Geophysical Year "into a decade of worldwide scientific cooperation."

February 11: The Supplemental Defense Appropriation Act, 1958, stated: "The Secretary of Defense is authorized to transfer not exceeding $10,000,000, to remain available until expended, from any appropriations available to the Department of Defense for the current fiscal year for such advanced research projects as he may designate and determine. * * *". It was provided that current fiscal year appropriations for related programs might be transferred to and merged with this appropriation, and that amounts of this appropriation might be transferred to other appropriations for advanced research under the Department of Defense.

February 12: Public Law 325 gave the Department of Defense authority to participate in advanced research projects, including space projects. Section 7 read in part:

"The Secretary of Defense or his designee is authorized to engage in such advanced projects essential to the Defense Department's responsibilities in the field of basic and applied research and development which pertain to weapons systems and military requirements as the Secretary of Defense may determine after consultation with the Joint Chiefs of Staff; and for a period of one year from the effective date of this Act, the Secretary of Defense or his designee is further authorized to engage in such advanced space projects as may be designated by the President."

February 13: The National Society of Professional Engineers proposed establishment of a Federal Space Exploration Commission to undertake and have unified responsibility for a program of space exploration. The commissioners would be appointed by the President, and the civilian commission "would be able to give the military services adequate opportunity for rocket and missile development—as consistent with the defining of service roles at the highest policy level."

February 14: Basic Objectives of a Continuing Program of Scientific Research in Outer Space, a report by the Technical Panel on the Earth Satellite Program of the United States National Committee for the International Geophysical Year was published. The report proposed a program of space research extending beyond the International Geophysical Year. It outlined the technical investigations which should be made by sounding rockets, lightweight and advanced satellites, lunar probes, planetary and interplanetary research, and manned space flight, and gave a detailed description of the scientific information which could be gained from these experiments.

February 16: Airman Donald G. Farrell completed a week's isolation in a sealed space cabin at Randolph Air Force Base in an experiment testing atmospheric equipment for space flight on a simulated trip to the Moon, and the effects of this artificial environment on man's working ability. The small cabin was comparable in dimensions and equipment to what might go into a future spaceship. Air and liquids were recycled to simulate an actual space flight. During the course of the week Farrell was given various tasks to perform, and emergencies to meet.

——— Rocketdyne was assigned an Air Force study contract to develop a nuclear rocket.

February 17: In a letter to Soviet Premier Nikolai A. Bulganin, President Eisenhower repeated his plea for the dedication of outer space to peaceful uses. Denying that this proposal was intended "to gain strategic advantages for the United States," he stressed the urgency of dealing with outer space before its use for military purposes had, like nuclear weapons, advanced to the point where complete international control was almost impossible.

——— Vice President Nixon asked that space development be put into civilian hands.

February 18: The Air Force expects to launch a 3,000-pound satellite by October 1958, based on the Atlas. This would be part of the Lockheed Pied Piper system. Photographic, television, and infrared scanning systems are under consideration.

February 20: Senator Lyndon B. Johnson was elected chairman of the Senate Special Committee on Space and Astronautics.

February 21: According to the Soviet Geophysical Year Committee, the Russians fired to a 294-mile altitude a rocket containing 1½ tons of instruments for measuring the ion composition of the atmosphere, electronic temperature, air pressure, encounters with micrometeorite particles, the ultraviolet sector of the spectrum, and the concentrations of free electrons in the ionosphere and of positive ions.

February 25: Lieutenant General Putt requested permission to send a rocket to the Moon, to get there ahead of the Soviets.

February 27: The Air Force announced that plans were well advanced for a reconnaissance satellite weighing in excess of 1,300 pounds.

March 5: Pentagon sources expected the Army would be given a Moon assignment while the Air Force concentrated on manned vehicles.

——— Explorer II was launched but did not go into orbit because of failure of the final rocket to ignite. Unable to achieve the required velocity, it re-entered the atmosphere and was probably burned up before falling into the Atlantic Ocean 1900 miles southeast near Trinidad. The satellite weighed 31 pounds, was 80 inches long.

——— H. Res. 496, passed by the House of Representatives, established a Select Committee on Astronautics and Space Exploration to investigate the problems of outer space and to submit recommendations for the control and development of astronautical resources. Congressmen appointed to the Committee were: Majority Leader John W. McCormack, chairman, Overton Brooks, Brooks Hays, Leo W. O'Brien, Lee Metcalf, William H. Natcher, B. F. Sisk, Minority Leader Joseph W. Martin, Jr., vice chairman, Leslie C. Arends, Gordon L. McDonough, James G. Fulton, Kenneth B. Keating, Gerald R. Ford, Jr.

——— The following appointments to the Advanced Research Projects Agency were announced by the Department of Defense: Rear Admiral John E. Clark, USN, Deputy Director; Lawrence P.

Gise, Director, Program Control and Administration; Lambert L. Lind, Special Assistant to the Director.

March 7: George J. Feldman, New York attorney, was appointed director and chief counsel of the House Select Committee on Astronautics and Space Exploration.

March 9: Harold E. Stassen, in an address on foreign policy, urged the United States "to express willingness to join in a United Nations Space Development Agency which would endeavor as a United Nations project to send the first man into space and to send the first inspection photographic satellite around the earth."

March 14: General Medaris said that only the military services had the experience to run a successful space program.

March 15: In a Foreign Ministry statement the Soviet Union proposed that banning the use of outer space for military purposes, as suggested by President Eisenhower, be coupled with the liquidation of foreign military bases on the territories of other countries, especially in Europe, the Middle East, and North Africa. An international program for space research would be established under the control of the United Nations and each country would pledge to launch rockets only under this program. A new United Nations agency for international cooperation in research on cosmic space would develop this space program, continue the International Geophysical Year research program on a permanent basis, and serve as a clearing house and coordinator for national research.

March 16: Secretary of the Army Brucker said a rocket would be launched to the Moon "right soon," in a matter of a few months.

March 17: Vanguard I, a test sphere weighing 3.25 pounds, was launched at Cape Canaveral as the second United States IGY satellite by the Naval Research Laboratory. Spherical in shape, the satellite is 6.4 inches in diameter and weighs 3.25 pounds. It was constructed of aluminum and has one turnstile antenna and one dipole antenna with a total of six 12-inch rod elements. Although the satellite is not actually instrumented, temperatures can be deduced from changes in its radio frequencies. Two radio transmitters are carried: one operated on a frequency of 108.00 megacycles at a power of 10 milliwatts; the other radiates at 108.03 at 5 milliwatts of power. The higher power transmitter, powered by mercury batteries, ceased operating on April 5, 1958. The lower power transmitter, powered by six groups of solar converters, may operate indefinitely. The satellite's initial perigee was 404 miles, its apogee 2,465 miles, its period 134.39 minutes. It was launched at an inclination to the equator of 34.25°. The satellite's perigee speed was 18,400 miles per hour; its apogee speed was 12,400 miles per hour. The satellite is still in orbit, and is expected to remain there for perhaps 200 years.

——— An experiment testing the behavior of crews under conditions of long confinement was concluded at Wright Air Development Center, as 5 Air Force officers ended a 5-day simulated space flight.

March 18: The Institute for Defense Analysis, a nonprofit corporation serving the Department of Defense, announced the formation of an Advanced Research Projects Division and the appointment of Dr. Herbert F. York as its head. In this capacity Dr.

York would serve as Chief Scientist for the Defense Department's Advanced Research Projects Agency. He had been director of the University of California Radiation Laboratory at Livermore, California.

March 19: The House of Representatives voted $100,000 for expenses of its new space committee. (H. Res. 500, Report 1523.)

March 21: Richard P. Hines was appointed clerk of the House Select Committee on Astronautics and Space Exploration.

March 24: Senator Lyndon B. Johnson, chairman of the Senate Special Committee on Space and Astronautics, made the following staff appointments: Glen P. Wilson, coordinator of technical information; Eilene Galloway, special consultant.

March 25: Senator Lyndon B. Johnson announced the following appointments to the Senate Special Committee on Space and Astronautics: Edwin L. Weisl, consulting counsel; Cyrus R. Vance, consulting counsel; Homer Joe Stewart, scientific consultant.

March 26: President Eisenhower in a brief statement made public the President's Science Advisory Committee's report, Introduction to Outer Space; an Explanatory Statement. This report set forth the basic factors making the advancement of space technology a national necessity and explained to the nontechnical reader the principles and potentialities of space travel. The many uses of space technology for scientific and military purposes were summarized, and a timetable for carrying out these objectives was included.

——Explorer III, the third United States IGY satellite, was launched by the Army. Cylindrical in shape, it was 80 inches long, 6 inches in diameter, and weighed 31.0 pounds. The satellite had two dipole antennas, using the skin of the satellite itself which was constructed of steel. Instrumentation weighing 10.83 pounds was designed to measure cosmic rays, employing a tape recorder feature; micrometeor erosion; and temperatures within and on the skin of the satellite. One radio transmitter, operating on a frequency of 108.00 megacycles at 10 milliwatts of power, telemetered data on all of the experiments; the other transmitter, radiating on a frequency of 108.03 at 60 milliwatts of power, telemetered data on cosmic rays only. The 108.00 transmitter first ceased operating on May 10, 1958; its beacon feature only functioned again from May 15 to June 16, 1958. The 108.03 transmitter first ceased operating on May 14, 1958; it responded again erratically from May 22 to June 5, 1958. Both transmitters were powered by mercury batteries. The satellite's initial perigee was 118 miles, its apogee 1,740 miles, and its period 115.9 minutes. It was launched at an inclination to the equator of 33.37°. Its perigee speed was 18,860 miles per hour, and its apogee speed was 13,450 miles per hour. It reentered the atmosphere sometime between June 27–29, 1958, and presumably disintegrated.

March 27: President Eisenhower gave his approval to the plans for outer space exploration announced by Secretary of Defense Neil H. McElroy. The Advanced Research Projects Agency was to undertake several space projects including the launching of earth satellites and lunar probes. The Air Force Ballistic Missile Division was authorized by ARPA to carry out three lunar probes with a Thor-Vanguard system, and one or two lunar probes utilizing the Jupiter-C rocket were assigned to the Army Ballistic Missile Agency. Eight million dollars is initially allocated. A mechanical ground scanning system for lunar investigations was to be developed by the Naval Ordnance Test Station, China Lake, Calif.

—— Dr. Charles S. Sheldon II was named assistant director of the House Select Committee on Astronautics and Space Exploration.

March 28: Some military leaders were said to think the probe plan was too limited in scope and imagination.

March 31: General John B. Medaris was made head of the Army Ordnance Missile Command, with direct access to the Secretary and the Chief of Staff. General Toftoy is his deputy, and General John A. Barclay is the head of the Army Ballistic Missile Agency.

April 2: President Eisenhower in a message to Congress proposed the establishment of a National Aeronautics and Space Agency into which the National Advisory Committee for Aeronautics would be absorbed. This agency was to have responsibility for civilian space science and aeronautical research. It would conduct research in these fields in its own facilities or by contract and would also perform military research required by the military departments. Interim projects pertaining to the civilian program which were under the direction of the Advanced Research Projects Agency would be transferred to the civilian space agency. A National Aeronautics and Space Board, appointed by the President and composed of eminent persons outside the Government and representatives of interested Government agencies (with at least one member from the Department of Defense), was to assist the President and the director of the National Aeronautics and Space Agency.

—— The original budget request of $340,000,000 in new obligational authority for the Advanced Research Projects Agency for fiscal year 1959 was raised to $520,000,000 for advanced research projects in a letter from the Director of the Bureau of the Budget, Maurice H. Stans, which was transmitted to Congress by President Eisenhower.

April 3: In a message to Congress on the organization of the Nation's Defense Establishment, President Eisenhower recommended creation of the position of Director of Defense Research and Engineering, which would have a higher rank and replace the present Assistant Secretary of Defense for Research and Engineering. Among his other responsibilities, the Director would supervise the research activities of the Advanced Research Projects Agency.

April 5: S. Fred Singer, physics professor at the University of Maryland, was named head, scientific evaluation consultants of the House Select Committee on Astronautics and Space Exploration.

April 13: Sputnik II plunged to earth.

April 14: The proposal for a National Aeronautics and Space Agency drafted by the Bureau of the Budget was contained in the following congressional bills:

S. 3609, Senator Lyndon B. Johnson and Senator Styles Bridges

H. R. 11881, Representative John W. McCormack

H. R. 11882, Representative Leslie C. Arends
H. R. 11887, Representative Harry G. Haskell, Jr.
H. R. 11888, Representative Kenneth B. Keating
H. R. 11946, Representative William H. Natcher
H. R. 11961, Representative Peter Frelinghuysen, Jr.
H. R. 11964, Representative James G. Fulton
H. R. 11996, Representative Gordon L. McDonough

April 15: The Select Committee on Astronautics and Space Exploration of the House of Representatives opened hearings on outer space as a step toward formulating a national space program. During the hearings, which continued for three weeks, military and scientific experts discussed the scientific development of outer space and offered recommendations on the establishment of a civilian space agency.

April 17: Lieutenant General Gavin and Major General Medaris testified that appearance of a reconnaissance satellite over the United States should be treated as invasion, but urged the early development of a capability to operate such devices ourselves.

——— Six Navy men began a 7-day simulated trip to the Moon in a compression chamber at the Philadelphia Naval Base. The experiment met expectations, and the men stepped out afterward alert and healthy.

April 21: A naval flier began a 24-hour experiment wearing a space suit in a chamber evacuated to the equivalent of 80,000 feet altitude. He emerged tired but hungry.

April 22: Hearings on proposed reorganization of the Department of Defense opened before the House Committee on Armed Services.

——— Dr. Hugh Dryden testified that large aluminized balloons might be put in orbit around the Moon, after being carried to that vicinity in a small rocket, and then inflated.

April 23: A Thor-Able test vehicle was launched at Cape Canaveral in a reentry test. The nose cone contained the mouse Mia I. The Vanguard second stage failed to fire, and the mouse and cone were not recovered, as the shot fell short of the 5,000-mile goal.

April 24: Major General Schriever testified that Pied Piper has been assigned a priority equal to ballistic missiles.

April 25: Spencer M. Beresford was appointed special counsel of the House Select Committee on Astronautics and Space Exploration.

April 27: An article in Pravda on Soviet satellite findings reported that Laika's heartbeat had taken three times as long as expected to return to normal, once its acceleration due to the satellite's speed had ceased. Weightlessness affecting the nerve centers was suggested as the cause. The Soviet report disclosed that the density and temperature of the atmosphere at a given altitude were not uniform, and that cosmic ray intensity was 40 percent greater at 400 miles than at 135 miles. The article also contained information on the density of electrons and reported 1 mysterious 50-percent increase in radiation intensity.

April 28: An instrumented Vanguard satellite was launched by the Navy at Cape Canaveral, but due to failure of the third-stage rocket, did not attain the speed required to orbit around the earth. It burned up on reentry 1,500 miles away. The satellite was 21.5

pounds, 20 inches in diameter. Instruments were to record X-rays, temperatures, and meteor data. The fault was blamed on wiring.

April 29: General Doolittle opposed a Moon shot stunt of hitting the surface with a thermonuclear warhead.

April —: Maj. Gen. F. A. Bogart testified that by late fall the Air Force could launch 5 to 7 Moon rockets, with a 70 percent chance of success of impact for each one.

May 1: Scientific findings from the 2 Explorer satellites disclosed an unexpected band of high-intensity radiation extending from 600 miles above Earth to possibly an 8,000-mile altitude. The radiation, which was described by Dr. James A. Van Allen as "1,000 times as intense as could be attributed to cosmic rays," was believed to come from ionized gas; Dr. Van Allen felt lead shielding 1 millimeter thick would reduce this radiation about 90 percent. The Explorers also showed that the atmosphere at 220 miles was denser than predicted, that satellite temperatures would not be too great for humans, and that cosmic dust was only a small hazard to space travel. The radiation was totally unexpected, and raised many questions about manned flight into space because of the shielding which might be required. Future satellites will be instrumented to learn more of the characteristics of this band which were first reported from the original Explorer satellites.

May 6: The Senate Special Committee on Space and Astronautics opened hearings on the administration's proposal for a National Aeronautics and Space Agency.

May —: NACA shot a balloon to 50 miles, at Wallops Island. At that altitude, it was inflated. A 4-stage rocket launched the 9-pound balloon.

May 12: Scientists at an ICSU meeting in The Hague warned against any nuclear explosion on the surface of the Moon which would endanger later scientific measurements of its surface.

May 13: Majority Leader John W. McCormack introduced, at the direction of the House Space Committee, House Concurrent Resolution 326 calling for the peaceful use of space.

May 14: American scientists indicated in Washington that future Moon rockets would be sterilized to forestall any biological contamination of the Moon which would endanger later scientific studies of that body.

May 15: Sputnik III was launched by the Soviet Union. Conical in shape, it was reported to be 11 feet 9 inches long, 5 feet 8 inches wide at the base, and weighed 2,925 pounds. It had folded dipole and trailing rod antennas, and its shell composition was mainly of aluminum alloys. Instrumentation weighing 2,134 pounds was designed to measure atmospheric pressure and composition; concentration of positive ions; the satellite's electrical charge and the tension of the Earth's electrostatic field; tension of the Earth's magnetic field; intensity of the Sun's corpuscular radiation; composition and variations of primary cosmic radiation; distribution of photons and heavy nuclei in cosmic rays; and micrometeor and temperature measurements. The satellite carried 1 radio transmitter, powered by chemical and solar batteries, operating on a frequency of 20.005 megacycles; a second transmission at 40.01 megacycles is a harmonic of the first. The satellite's initial perigee was 180 miles, its apogee 1,167 miles, its period 106 minutes. It was launched with an inclination to the Equator of 65°. Its perigee speed was 18,337 miles per hour, its apogee speed 14,057 miles per hour. It is still in orbit.

May 18: A Jupiter missile fired from Cape Canaveral traveled 1,500 miles, and for the first time a full-scale nose cone was recovered intact.

May 21: The House Select Committee issued its first report to the House on "The National Space Program". (House Report No. 1758.)

May 23: The House Foreign Affairs Committee approved House Concurrent Resolution 332 (revision of 326). (House Report 1769.)

May 24: Capt. E. L. Breeding at Holloman Air Force Base withstood a gravity load of 83 g's for a small fraction of a second in the arresting of the rocket sled on which he was riding. He went into a state of shock, but recovered from this in about 10 minutes.

——— The House select committee reported out a clean bill calling for the creation of a civilian space agency. (H. R. 12575, House Report 1770.)

May 27: Vanguard II (SLV-1) launched at Cape Canaveral. Take-off was normal, all stages fired. Satellite was 21.5 pounds, 20 inches diameter. Instruments included meteor detectors, solar radiation measurers, and thermometers. Incorrect angle carried it to 2,000 miles, then it burned on reentry between Antigua and Africa. Radio returned data.

June 2: The House of Representatives adopted House Concurrent Resolution 332, the outer space peace resolution.

——— The House of Representatives passed unanimously its Select Committee bill H. R. 12575 to create a civilian space agency.

June 5: Dr. Walter Dornberger opposed any early rocket shot at the moon as a stunt, stating weapons development was more important.

June 10: Lt. Gen. Samuel E. Anderson stated the Air Force would launch moon probes in August, September, and October. Air Force Secretary Douglas and ARPA Director Johnson denounced the report as unauthorized, premature, and inaccurate; suggested launching dates should be wholly disregarded.

June 11: The Senate Special Committee on Space and Astronautics reported out S. 3609 as amended. (Senate Report 1701.)

June 16: The Senate passed H. R. 12575 with the text of S. 3609, as amended, substituted for the House text, and the bill was sent to conference.

June 22: Aviation Week in an article termed speculative by ARPA officials predicted that the first Pied Piper satellite would be launched from Camp Cooke, California, using the Thor at the end of 1958 or in early 1959. A variety of scanning instruments are to be used, and the vehicle is to be stabilized in orbit. It is called WS 117L.

June 26: A Vanguard was launched at Cape Canaveral. Takeoff was normal, but second stage failed to fire. The satellite was 21.5

pounds, 20 inches in diameter. The instrument load was the same as for the April 28 attempt.

July 9: A second Thor Able was launched at Cape Canaveral. It traveled 6,000 miles into the South Atlantic. Its mouse passenger, Mia II, was believed to be still alive when the cone reached the surface of the ocean, but after 3 days the search was called off when the radio in the cone became silent.

July 15: House and Senate conferees agreed upon a compromise version of H. R. 12575 to create the National Aeronautics and Space Administration. (House Report 2166.)

July 16: The House and Senate adopted the conference report on H. R. 12575.

July 21: The House of Representatives approved House Resolution 580 establishing a 25-member standing Committee on Science and Astronautics.

July 23: A third Thor Able was launched at Cape Canaveral in another reentry test. A safe landing 6,000 miles downrange near Ascension was indicated, but the cone with its mouse passenger, Wickie, was not located after 2 days of searching.

——The Senate approved House Concurrent Resolution 332 calling for the peaceful exploration of outer space.

July 24: The Senate established a standing committee on Aeronautical and Space Sciences, under Senate Resolution 327.

July 26: Explorer IV, the fourth United States IGY satellite was launched. Cylindrical in shape, it is 80 inches long, 6 inches in diameter, and weighs 37.10 pounds. The satellite has two dipole antennas, using the skin of the satellite itself which is constructed of stainless steel. It carries 2 Geiger-Mueller counters and 2 scintillation counters to measure corpuscular radiation at several intensity levels. The instrumentation weighs 18.26 pounds. Two radio transmitters are carried: one operated on 108 megacycles at 10 milliwatts of power and ceased transmitting on September 3, 1958; the other operated on 108.03 megacycles at 30 milliwatts of power and ceased transmitting on October 6, 1958. Both were powered by mercury batteries, and both broadcast all five channels of information simultaneously and continuously, although the low-power transmitter was primarily for tracking. The satellite had an initial perigee of 157 miles, an apogee of 1,380 miles, and a period of 110 minutes. It was launched with an inclination to the Equator of 50.13°. Its perigee speed was 18,406 miles per hour, its apogee speed was 14,232 miles per hour. It is still in orbit.

——A Navy balloon carried Comdr. Malcolm Ross and M. Lee Lewis to 82,000 feet in a flight lasting 34 hours 29 minutes, a new high altitude duration record. Televised pictures were returned to Earth. The launching occurred near Crosby, Minn., and the landing near Jamestown, N. Dak.

July 28: Brig. Gen. Homer A. Boushey was named director of a new advanced technology section of the Air Force.

——Scientists of East and West recommended that satellites be used to detect any violations of agreements to suspend nuclear tests.

July 29: The President signed H. R. 12575, making it the National Aeronautics and Space Act of 1958, Public Law 85-568.

July 30: The President requested $125 million to launch the new NASA.

July 31: The U. S. S. R. released its first comprehensive sputnik data to foreign scientists on this occasion, but subsequent negotiations in Moscow brought no assurance that further information would be forthcoming automatically.

——— The Senate Special Committee on Space and Astronautics approved S. 4208 authorizing the appropriation of $47.8 million for NASA construction and equipment during fiscal 1959. (Senate Report 2076.)

August 1: The Senate voted to approve S. 4208.

——— The House Select Committee on Astronautics and Space Exploration held a public hearing on the proposed construction and equipment authorizations for NASA, and reported out H. R. 13619, a companion bill to S. 4208.

——— The United States fired a nuclear weapon over Johnston Island, believed to have been by means of a Redstone missile, and at an altitude of 100 miles. The flash was visible in Honolulu, 750 miles away. Newspaper speculation was that such a blast in space could send out swarms of neutrons capable of triggering prematurely the nuclear war-head of an approaching ICBM.

August 2: The National Academy of Sciences and the National Research Council set up a new Space Science Board of 16 members, with Dr. Lloyd V. Berkner as chairman. The purpose is to study scientific research opportunities, to make recommendations to interested agencies, and to stimulate research interest and cooperative activities with groups at home and abroad. Some 11 ad hoc committees have been organized to carry on the work of the Space Science Board in various areas of interest.

August 4: The House of Representatives passed S. 4208, in substitution for H.R. 13619.

August 6: Under House Resolution 685, the House voted an additional $85,000 for the operation of the Select Committee on Astronautics and Space Exploration. (House Report 2468.)

August 8: Dr. T. Keith Glennan, President of the Case Institute of Technology, was nominated to be Administrator and Dr. Hugh L. Dryden, Director of the National Advisory Committee for Aeronautics, as Deputy Administrator of the NASA.

August 12: A second nuclear explosion at high altitude was fired over Johnston Island, also visible in Honolulu.

August 13: The Senate Appropriations Committee approved the Supplemental Appropriations bill (H. R. 13450), containing $75 million in funds for NASA for fiscal 1959, a reduction of $50 million below the amount requested by the President. (Senate Report 2350.)

August 14: The President signed Senate 4208 authorizing appropriations to NASA for construction, making it Public Law 85-657.

——— The Senate Special Committee on Space and Astronautics approved the nominations of Dr. Glennan and Dr. Dryden.

August 15: The Senate approved the Supplemental Appropriation bill with the $50 million cut restored along with an amendment by Senator Johnson requiring annual authorizations henceforth before any additional funds could be appropriated for NASA.

——— Dr. Glennan and Dr. Dryden were confirmed by the Senate.

August 17: First Air Force lunar probe was launched, using Thor Able. An explosion ripped it apart 77 seconds after launch, at an altitude of about 10 miles. It has been designed to put 40 pounds of instruments in an orbit around the moon, to take pictures of the back side. In addition to the scanning device, it contained a magnetometer, a meteorite counter, and thermometers. The voyage had been intended to take 2½ days.

August 19: House and Senate conferees agreed on $80 million for NASA for fiscal 1959, a cut of $45 million below the amount requested by the President, together with the Johnson rider on authorizations. (House Report 2677.)

August 20: The House approved the Supplemental Appropriation bill conference report containing the $80 million in funds for NASA, but rejected the Johnson rider, sending this provision back to conference. The Senate voted to insist on the Johnson rider.

August 21: The House and Senate passed a new conference report on the Supplemental Appropriation bill including the $80 million for NASA and a new compromise requiring for a one year period new authorization authority over all appropriations for NASA.

August 24: The Senate appointed the membership of its new standing Committee on Aeronautical and Space Sciences. They are: Senators Johnson (Chairman), Russell, Green, Hayden, Magnuson, Anderson, Symington, Kerr, Bridges, Wiley, Hickenlooper, Saltonstall, Bricker, Smith (Maine), and Javits.

——— Explorer V was launched at Cape Canaveral. Takeoff was normal. But after separation of first stage, its residual fuel carried it forward to bump and deflect from course the remaining stages. They fired normally, but failed to carry it into orbit, on a path northeast from the Cape. Satellite weighed 31 pounds, was 80 inches long, was designed to measure radiation belt.

August 25: The International Astronautical Federation opened its Ninth Annual Congress for a week of meetings in Amsterdam, the Netherlands.

August 26: It was announced that two mice at the University of Texas had been kept alive 36 days sealed in a space chamber, depending exclusively on the oxygen production of algae sealed into the same system with them.

August 27: The Soviet Union sent two dogs to an altitude of 281 miles and returned them safely. The payload of the rocket was 3,718 pounds. In addition to the biological equipment, the rocket contained cameras to study the dogs, and a variety of instruments for geophysical purposes. The rocket was stabilized in flight, to prevent rotation. The dogs were named Belyanka and Pestraya. The instruments included measurers of free electrons in the ionosphere, the ionic composition, the concentration of positively charged ions, electronic temperatures, air pressure, infrared radiation, and micro-meteorite impact. The rocket was of single stage construction. Aerodynamic brakes were used, and the dog compartment was separated from the main rocket for parachute landing near the end of the ride.

——The President signed the Supplemental Appropriation bill, HR 13450, making it Public Law 85-766. The law included $80 million for NASA, including $50 million for research and development, $25 million for construction and equipment, and $5 million for salaries and expenses.

September 2: Speaking for the President, Ambassador Henry Cabot Lodge announced the United States would propose to the United Nations a plan for international cooperation in the field of outer space.

September 4: The President appointed to the National Aeronautics and Space Council Detlev W. Bronk, President of the National Academy of Sciences, William A. M. Burden, Lt. Gen. James H. Doolittle (ret.), and Alan T. Waterman, Director of the National Science Foundation. Statutory members additionally include the Secretary of State, the Secretary of Defense, the Chairman of the Atomic Energy Commission, and the Administrator of the National Aeronautics and Space Administration.

September 5: Lt. Richard H. Tabor began a stay of several days in a pressure suit in a chamber exhausted to the equivalent of 80,000 to 100,000 feet altitude.

——The Air Force announced a delay in the second launching attempt of a lunar probe from September 13 until the appropriate time in October.

September 7: The British Black Knight missile was launched at Woomera, Australia to an altitude of over 300 miles.

September 11: Secretary General Dag Hammarskjold called for an international agreement banning possible national claims to the Moon or other outer space bodies.

September 12: Wallops Island was announced as a future satellite launching station for the NASA.

September 24: The President held the first meeting of the National Aeronautics and Space Council.

September 26: Vanguard was launched at Cape Canaveral. Takeoff was normal, and all stages fired. The slight failure to attain desired speed probably carried it into an orbit around the world for 2 or 3 passes, then it burned on reentry. The satellite weighed 21.5 pounds, was 20 inches in diameter. It carried instruments designed to measure cloud cover, with a tape recorder to store data for command release.

September 29: The United States formally announced it would take measures to prevent contamination of the moon on all lunar probes, and that it had done so for the abortive August attempt.

September —: Dr. W. Albert Noyes was appointed chairman of a 4-man United States committee to draft proposals for international cooperation in the space sciences for the consideration of the ICSU (International Council of Scientific Unions).

October 1: The NASA was activated, and the NACA was abolished at the close of business on September 30, with all personnel and facilities transferred to the new agency. At the same time, major control of space activities in the Department of Defense was transferred to NASA. Project Vanguard personnel of the Navy were moved to NASA. Two Air Force and two Army lunar probes were transferred, but the services kept the actual work of construction and launching.

October 2: The ICSU executive board presented a plan to create a Committee on Space Research, to be known as COSPAR.

October 8: For the first time, the Soviet Union has supplied to other IGY members a telemetry code to Sputnik III, covering only the space radiation measurements.

October 11: Pioneer I, the first successful space probe, was launched by the United States from Cape Canaveral, Fla., at 3:42 a. m., eastern standard time. The launching was accomplished by the Air Force Ballistic Missile Division under the management direction of the National Aeronautics and Space Administration using a Thor-Able rocket combination. The space probe, named Pioneer I, reached a record altitude of about 71,000 miles and telemetered to earth data on radiation encountered in outer space, micrometeors, temperatures, and the earth's magnetic field. The launching vehicle was a 4-stage rocket weighing approximately 112,000 pounds with a total length of 88.1 feet. A velocity of 35,250 feet per second (24,015 miles per hour) had been planned for the probe. However, because the Pioneer I traveled about 3.5° above the designed flight path, the actual velocity attained was about 34,400 feet per second (23,447 miles per hour). The toroidal-shaped payload, pierced by the terminal-stage rocket, was 29 inches in diameter and weighed 85 pounds. The weight of the instrument package itself was approximately 30 pounds. Pioneer I was constructed of Fiberglas, and was painted in a special pattern as a means of controlling temperatures. Last radio contact with Pioneer I occurred at 10:46 p. m., eastern standard time, October 12, 1958, as it fell back toward the earth. The probe presumably disintegrated in the earth's atmosphere over the South Pacific shortly thereafter. Attempts to modify its flight path into a permanent eccentric orbit around the Earth failed because a retro-rocket could not be fired following a battery failure.

October 15: The X-15 rocketship was publicly unveiled for the first time. It is designed to be dropped from a bomber over Wendover, Utah, rocket upward to coast as much as 100 miles high, then glide to a landing at Edwards Air Force Base, Calif. The top speed is to be about 3,500 miles per hour. The ship is equipped with both normal aerodynamic controls for use in the atmosphere and with small steering rockets for use in space. It is intended to supply many answers to heating and control. Three such ships are being built by North American Aviation for the NASA, the Air Force, and the Navy's joint program. Although not a true space ship, the X-15 is an important forward step toward the knowledge future ships, particularly those used for controlled reentry, will require.

October 22: Beacon, an intended satellite, launched at Cape Canaveral by a Jupiter C. The final stage weighed 42.77 pounds, and included a 9.2 pound aluminized plastic balloon of 12 feet diameter for inflation in space. Was to circle at 400 miles, although alternatively announced for a 1,500-mile orbit. Within 2 or 3 minutes of launching, it was apparent the last 2 stages had not fired. The point of reentry was unknown.

October 27: The first Air Force satellite in a polar orbit is expected to be launched in December 1958 or January 1959 from Vandenberg Air Force Base, to study the radiation band of earth.

October 29: The President held the second meeting of the National Aeronautics and Space Council to give preliminary consideration to the possible transfer of the Army Ballistic Missile Agency facilities and personnel at Huntsville and the Army's Jet Propulsion Laboratory at the California Institute of Technology, Pasadena, to NASA.

November 6: Dr. Newell D. Sanders said that Thor Able was capable of launching probes to Mars and Venus. Venus will enter a favorable postion in 1959, and Mars in 1960–61.

November 8: Pioneer II, launched by a Thor Able, climbed from Cape Canaveral about 1,000 miles, then fell 45 minutes later 7,500 miles away over east central Africa, burning on reentry. The third stage failed to ignite. The failure seems to have been caused by a broken wire.

November 13: The United States proposed the appointment of a United Nations study committee to consider the problems of outer space.

November 15: COSPAR ended a meeting at the Royal Society in London in which by-laws and rules were drawn up for the approval of ICSU. The president of the executive committee is Prof. H. C. van der Hulst of the Netherlands. Other countries represented are the United States, France, the U. S. S. R., and the United Kingdom. Nine scientific unions and three other scientists are represented in COSPAR.

November 17: Senator Lyndon B. Johnson appeared before the Political Committee of the General Assembly of the United Nations to demonstrate bipartisan political support for the United States plan for study of outer space problems.

November 18: The Soviet Union withdrew its demand that the problems of outer space study be coupled with withdrawal of the United States from forward bases.

——— The Vanguard satellite was abandoned for any further launching attempts during the IGY.

November 19: ARPA announced that late in 1960, a large communications satellite is to be placed in a stationary orbit over the Equator at a distance of 22,300 miles above the Earth. This relay satellite will weigh many tons. Launched by a 3-stage rocket, the first stage will include 8 Jupiter-type motors clustered to produce about 1.5 million pounds of thrust. Either an Atlas or a Titan will make the second stage. A third stage is under development.

November 21: After a deadlock of United States-Soviet negotiations on the outer space plan, the United States and 17 other nations came forward with a new formula for a study committee.

——— A Vanguard was test-fired on the stand, but not launched.

November 24: The 18-nation plan for a study committee was approved by the main Political Committee of the United Nations by a vote of 54 to 9 with 18 abstentions. The Soviet bloc voted against the plan. Provisions of the plan as passed included the establishment of an ad hoc committee to study the resources available for the peaceful use of outer space. Work similar to that of the IGY is to be continued. There is to be mutual exchange of information, and plans are to be coordinated to the greatest extent possible, with opportunity made for all nations to participate. The committee was to consider future organizational relations with the United Nations, and the nature of legal problems expected to arise in carrying out programs to explore outer space.

November 25: NASA plans for 1959 some 8 space probes, including ones to be sent to the vicinity of the Moon, Mars, and Venus, as well as the 4 remaining Vanguard satellites.

November 28: An Atlas missile was shot over full range for the first time, a distance of 6,325 miles from Cape Canaveral, into the South Atlantic to within 30 miles of the predicted point of impact.

December 1: Aviation Week reported that a Soviet nuclear-powered bomber is now flying. Its speed is said to be in the sonic range, with two 35,000 pound thrust nuclear jets, and two conventional jets. The gross weight is 300,000 pounds, and the length about 195 feet.

——— The Los Alamos Laboratory announced it is working on a space ship propulsion scheme using small nuclear explosions rather than an atomic reactor. Rail mounted sleds are to be used in the early stage of experimentation.

December 3: The Department of Defense announced a long-range program to put mice, monkeys, and finally men into orbit. The first launching of new Project Discoverer is to take place at Vandenberg AFB on the California coast in January 1959, at first to test the capabilities of the Thor launcher, and later to carry animals, leading up to later launchings with Atlas with as much as 5 tons placed in orbit. Reentry tests will be conducted, and the 5th or 6th will carry a monkey instead of mice. The polar orbit will call for a southward launching over the Pacific. The first vehicle will weigh about 1,300 pounds, with a payload of several hundred pounds. Another purpose of the project is to develop an early warning capability against enemy missile launchings. ARPA Director Johnson indicated Sentry launchings would be delayed. The early warning version will be called Midas, and will be equipped with infrared detectors.

——— A new radio telescope at Camp Irwin, Calif., called the Goldstone Tracking Facility, is operated by the Jet Propulsion Laboratory. It can maintain radio contact at distances up to 400,000 miles, and by 1962 should be capable of receiving signals from as far as 4 billion miles.

——— The President held the third meeting of the National Aeronautics and Space Council. At this meeting it was decided to transfer the Jet Propulsion Laboratory of the California Institute of Technology, an Army contractor, to similar status within NASA. The Redstone Arsenal was not transferred at this time, but is to serve as a contractor for the NASA on a fully cooperative basis. The JPL has property of $55 million and a staff of 2300.

December 6: Pioneer III, the fourth of five space probes scheduled by the United States as part of its contribution to the IGY and the second to travel many earth radii out into space, was launched from Cape Canaveral, Fla., at 12:45 a. m. eastern standard time.

The launching was accomplished by the Army Ballistic Missile Agency and the Jet Propulsion Laboratory of the California Institute of Technology, under management direction of the National Aeronautics and Space Administration. The vehicle consisted of a modified Jupiter IRBM, called Juno II, as the booster or first stage, and 15 Sergeant rockets clustered in 3 high-speed upper stages: 11 in the second stage, 3 in the third, and 1 in the fourth stage. The 12.9-pound, gold-plated probe was instrumented to provide information on the Van Allen radiation zone. The scientific data were telemetered to earth on a frequency of 960.05 megacycles. Although the probe did not achieve its maximum objective, the environs of the Moon and beyond to a heliocentric orbit, its altitude of about 63,000 statute miles above the surface of the earth enabled it to obtain valuable scientific data through measurements of the Van Allen radiation zone at 2 different times and also at 2 different locations. It is estimated that the probe reentered the atmosphere at 2:51 p. m. eastern standard time, December 7, 1958, over French Equatorial Africa and, presumably, disintegrated. The reason the speed reached 24,000 miles per hour instead of 24,955 was the premature cut-off of fuel in the first stage, 3 seconds too soon.

December 13: The United Nations by a vote of 59 to 9 with 19 abstentions approved the United States plan to set up an 18 nation study committee on outer space.

——— Jupiter launched at Cape Canaveral with 1 pound monkey, Gordo, for flight 300 miles up and more than 1,500 miles down range. The monkey made the trip, including 8.3 minutes of weightlessness without untoward effects, including 10 g during take off and 40 g during reentry at 10,000 miles per hour. However, the float mechanism failed, and the cone was not recovered.

December 16: The first Thor launching at Vandenberg Air Force Base went its scheduled 1,500 miles out the Pacific Missile Range to open such use of the new facility. The same day a shot with similar results were obtained at Cape Canaveral with another Thor.

December 17: NASA assigns the code name Project Mercury to the man-in-space goal. Rocketdyne of North American awarded contract to build an engine of up to 1.5 million pounds of thrust.

December 18: The United States Air Force, in behalf of ARPA successfully launched into orbit from Cape Canaveral the entire rocket casing of an Atlas missile at 6:02 p.m. Starting with a weight of 244,000 pounds, between 8,500 and 8,700 of which are believed to be in orbit. The apogee was estimated at 920 miles and the perigee at 115 miles, giving an estimated life of about 20 days. The code name Project Score was assigned. Carrying about 150 pounds of instruments, the satellite was designed as a communications relay station. The total thrust of the rocket was about 360,000 pounds. The orbit was at an angle of 32° to the Equator.

December 19: The President's voice was broadcast from a tape recorder on the Atlas satellite, on 132.435 and 132.905 megacycles.

——— The Bold Orion, WS-199, test vehicle was launched from a B-58 bomber flying at 1100 miles per hour over Cape Canaveral. The new ballistic missile with a range of 1,000 to 1,500 miles is to be launched at altitudes up to 60,000 feet, will climb to 150 miles. Earlier versions built by Martin launched from B-47 bombers have traveled over 1,000 miles. There is an equally successful Convair-Lockheed version.

December 20: New messages were sent to the Atlas satellite, both voice and teletype, to be recorded and then rebroadcast on command later.

——The first attempt to launch a Titan at Cape Canaveral was cut off after ignition because of a malfunction. General Schriever announced that later the Titan will be capable of manned circumlunar flight.

——Leonid Sedov in Moscow pointed out that all three Soviet sputniks put heavier carrier rockets into orbit than the Atlas satellite, and that in contrast with the announced Atlas payload, even the 184 pounds of Sputnik I was greater, not to mention the 1118 pounds of Sputnik II and the 2,919 pounds of Sputnik III. He also pointed out that the lowest Sputnik altitudes were 140 miles, giving a longer lifetime for all launchings.

December 21: Seven teletype messages were sent simultaneously to the Atlas satellite, and on the next orbit all seven messages were delivered simultaneously. Later that day, seven simultaneous messages were sent to the satellite, and concurrently were rebroadcast with successful pickup at other stations.

December 23: The first C-series Atlas was fired at Cape Canaveral, performing perfectly in a 4,000-mile flight.

December 24: Dr. Herbert F. York is named to the post of Director of Defense Research and Engineering in the Department of Defense.

December 27: The President approved establishment of a new Federal Council for Science and Technology, to be headed by Dr. James R. Killian, Jr. The move is apparently designed to head off the creation of a new Department of Science. The President's Scientific Advisory Committee prepared the report. The Council will probably include the heads of the National Science Foundation, the Atomic Energy Commission, the National Aeronautics and Space Administration, the Research and Engineering Assistant Secretary of the Department of Defense, and policy officials from Commerce, Interior, Agriculture, and Health, Education, and Welfare.

——Dr. James Van Allen revealed from Pioneer III data that the Earth is surrounded by two bands of radiation. The first band begins 400 to 600 miles up, reaches a peak between 1,400 and 3,400 miles, falls off sharply, then rises to a new peak between 8,000 and 12,000 miles out, then falling off to very low values. The Earth's magnetic field is insignificant after about 36,000 miles. The radiation belt has openings at the poles so that launchings can escape the worst effects. It is not yet known whether the particles are electrons or protons, with a consequent uncertainty over the number of roentgens strength. If protons, the peak strength (the second layer) is 100 roentgens an hour; if electrons, about 10 roentgens an hour.

December 29: The Department of Defense revised the estimated life of the Atlas satellite to 45 days, from the previously estimated 20 days.

POSTSCRIPT

January 2, 1959: Within minutes of the time this committee met to approve this report came the announcement from Radio Moscow that a Soviet lunar probe was traveling in the direction of the Moon after attaining a speed of better than 25,000 miles per hour. It was already 66,000 miles on the way, and reportedly consisted of a final stage weighing 3,245 pounds, with a 796-pound instrument package. Instruments said to be contained were to measure the magnetic field of the Moon, cosmic ray intensity, gamma radiation, radioactivity of the Moon, heavy nuclei in cosmic rays, the gas composition of space, meteor impacts, and corpuscular radiation. If the report details are borne out this chronology ends on as jarring a note as it began.

O

Dr. John Cobb Cooper, former director of the Institute of International Air Law, McGill University, and now of Princeton, N. J.
Loftus Becker, legal adviser, Department of State
Hon. Harris Ellsworth, Chairman, Civil Service Commission
Dr. B. Litman, project head, inertial equipment, American Bosch Arma Corp., Hempstead, N. Y.
Hon. Harry G. Haskell, Jr., [illegible] (Delaware), United States House of Representatives
Andrew G. Haley, president, International Astronautical Federation; attorney, Washington, D.C.
Leonard Niederlehner, Deputy General Counsel, Department of Defense
K. T. Keller, former president and chairman of the board, the Chrysler Corp., Detroit, Mich.

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APPENDIX 7

A CHRONOLOGY ON SPACE AND ASTRONAUTICS

Prepared by Catherine S. Corry, Research Assistant, Senior Specialists Division, Legislative Reference Service, The Library of Congress

1948

December 29: The First Report of the Secretary of Defense, James Forrestal, reported that the United States had been engaged in research on an earth satellite. The Report of the Executive Secretary of the Research and Development Board, contained as an appendix, stated:

"The Earth Satellite Vehicle Program, which was being carried out independently by each military service, was assigned to the Committee on Guided Missiles for coordination. To provide an integrated program with resultant elimination of duplication, the committee recommended that current efforts in this field be limited to studies and component designs; well-defined areas of such research have been allocated to each of the three military departments." [National Military Establishment, First Report of the Secretary of Defense, 1948, p. 129.]

1954

August 26: The Supplemental Appropriations Act, 1955 appropriated $2,000,000 to the National Science Foundation for carrying out the United States program for the International Geophysical Year. [Supplemental Appropriation Act, 1955, Public Law 663, 68 Stat. 818.]

October 4: The Special Committee of the International Geophysical Year concluded its meeting in Rome, Italy, during which it adopted the following recommendation:

"In view of the great importance of observations during extended periods of time of extraterrestrial radiations and geophysical phenomena in the upper atmosphere, and in view of the advanced state of present rocket techniques, CSAGI recommends that thought be given to the launching of small satellite vehicles, to their scientific instrumentation, and to the new problems associated with satellite experiments, such as power supply, telemetering, and orientation of the vehicle." [Special Committee of the International Geophysical Year. Meeting of the Special Committee of the International Geophysical Year, Rome, Sept. 30–Oct. 4, 1954. Part XI, p. 5.]

December 21: The Department of Defense in a two-sentence comment reported that studies continued to be made in the earth satellite vehicle program. The statement, approved by Secretary of Defense Charles E. Wilson, was issued after a press conference statement by the Secretary that he was unaware of an American satellite program. [New York Times, November 17, 1954, p. 15. Ibid., December 22, 1954, p. 10.]

1955

April 15: The *Soviet* newspaper, Vechernaya Moskva, announced that a commission for interplanetary communication, including physicist, Peter Kapitsa, had been created to develop an earth satellite, which would improve weather forecasting by taking photographs. [New York Times, July 30, 1955, pp. 1, 7.]

June 30: The Independent Offices Appropriation Act, 1956, appropriated "$10,000,000 to remain available until June 30, 1960," for the American International Geophysical Year program. [Independent Offices Appropriation Act, 1956, Public Law 112, 69 Stat. 208.]

July 29: The National Academy of Sciences and the National Science Foundation announced that the United States was planning to construct an earth satellite which would be launched during the International Geophysical Year. These organizations would sponsor the project with assistance from the Department of Defense which would furnish the equipment and facilities. The program was to be carried out under the IGY program and "the results obtained will be made available to the scientists of the world." A White House briefing on the announcement was given by James C. Hagerty and noted scientists, who discussed the scientific data which earth satellites would provide. They announced that the satellite would probably be the size of a basketball and might carry instruments; few other details of the vehicle were described. A letter from Joseph Kaplan, chairman of the United States National Committee for the International Geophysical Year, announcing the United States satellite plans in response to the October resolution of the Special Committee for the International Geophysical Year was delivered to Professor Sydney Chapman, its president. [New York Times, July 30, 1955, pp. 1, 9.]

August 2: L. I. Sedov, chairman of the U. S. S. R. Academy of Sciences Interdepartmental Commission on Interplanetary Communications, made the following statement at a press conference during the International Congress of Astronauts, according to the Tass announcement: "In my opinion, it will be possible to launch an 'artificial satellite of the Earth' within the next two years, and there is a technological possibility of creating 'artificial satellites' of various sizes and weights." [Krieger, F. J A casebook on Soviet astronautics. RM–1760, ASTIA Document Number AD 108750, June 21, 1956. (U. S. Air Force Project Rand, Research Memorandum), p. 2.]

1956

May 19: Under the Second Supplemental Appropriation Act, 1956, the National Science Foundation received an appropriation of "$27,000,000, to remain available until June 30, 1960" for the International Geophysical Year. [Second Supplemental Appropriation Act, 1956, Public Law 533, 69 Stat. 207.]

June 21: The Rand Corporation issued a research memorandum, A Casebooks on Soviet Astronautics, by F. J. Krieger. The casebook contained both a bibliography of Soviet literature and complete translations of selected Russian articles and papers on this subject. [Krieger, F. J. A casebook on Soviet astronautics. RM–1760, ASTIA Document Number AD 108750, June 21, 1956. (U. S. Air Force Project Rand, Research Memorandum.)]

September 15: The Special Committee for the International Geophysical Year announced that among the resolutions approved by scientists from 40 countries, including the United States and the Soviet Union, were those recommending the use of standard instruments for tracking satellites and the release of technical information on tracking equipment by those countries with satellite programs. [New York Times, September 16, 1956, pp. 1, 30.]

December 8: The first test rocket in the American satellite program was fired by the Navy from the Air Force Missile Testing Center, Cocoa, Florida. A device carrying a radio transmitter, Minitrack, was ejected from the Viking rocket, which reached a 125-mile altitude. [New York Times, December 9, 1956, pp. 1, 79.]

1957

January 10: President Eisenhower in his State of the Union Message declared that "we are willing to enter any reliable agreement which would * * * mutually control the outer space missile and satellite development." [New York Times, January 11, 1957, p. 10.]

April 11: Satellite equipment, including a radio transmitter and instruments for measuring temperature, pressure, cosmic rays, and meteoric dust encounters, was tested above earth for the first time, as a rocket containing this equipment was fired by the Navy to a 126-mile altitude. [New York Times, April 12, 1957, pp. 1, 14.]

June: Observations on Radio Signals from the Artificial Terrestrial Satellite and their Scientific Value, an article by A. Kazantsev in Radio, reported that the first Russian satellite would contain two radio transmitters operating at about 20 and 40 megacycles and described the manner in which the signals from the transmitters would be emitted. [Kazantsev, A. Observations on radio signals from the artificial terrestrial satellite and their scientific value. Radio. Moscow, June 1957, pp. 17–19. (English translation.)]

June 10: The Soviet Union announced that it planned to launch satellites in a few months in a document sent to Lloyd V. Berkner, a reporter on rockets and satellites to the IGY. Contents of the report, which stated that the Soviet [illegible] were made public at International [illegible] on June 21 and supplemented [illegible] press conference June 18, 1957. [New York Times, June 22, 1957, p. 12.]

June 21: A Casebook on Soviet Astronautics—Part II by F. J. Krieger was issued by the Rand Corporation as a continuation of its research memorandum of June 21, 1956. [Krieger, F. J. A casebook on Soviet astronautics—Part II. RM [illegible], ASTIA Document Number AD 133018, June 21, 1957. (U. S. Air Force Project Rand, Research Memorandum).]

July 1: The International Geophysical Year began. Sixty-four nations were to participate in the scientific program which would last for 18 months and would be carried out under a special committee of the International Council of Scientific Unions. [New York Times, July 1, 1957, pp. 1, 10.]

August 20: Major David G. Simons completed a 32-hour flight in a balloon, which reached a record altitude of over 100,000 feet and remained above 90,000 feet for [illegible] hours. The experiment tested man's adaptation to life at high altitudes through creation of an artificial atmosphere; cosmic radiation tests were also made. [New York Times, August 21, 1957, pp. 1, 17.]

August 28: The Supplemental Appropriation Act, 1958 appropriated $34,200,000 for the United States Scientific Satellite, "to be derived by transfer from such annual appropriations available to the Department of Defense as may be determined by the Secretary of Defense, to remain available until expended." [Supplemental Appropriation Act, 1958, Public Law 170, 71 Stat. 428.]

October 4: The Soviet Union launched the first earth satellite, Sputnik I. Spherical in shape with a diameter of 22.8 inches, this 184 pound satellite circled the world in an initial time of 96.2 minutes. Its orbit was elliptic with an altitude range from 135 to 560 miles and was inclined at an angle of 65 degrees to the equatorial plane. Sputnik I carried two radio transmitters operating at 20.005 and 40.002 megacycles. [New York Times, October 5, 1957, p. 3. *Ibid.*, March 27, 1958, p. 15.]

October 5: Resolutions of an international conference on rockets and satellites provided for continuation of internationally coordinated research in these fields beyond the International Geophysical Year. Both American and Russian scientists were present at the conference. [New York Times, October 6, 1957, p. 44.]

October 9: President Eisenhower in a White House press release congratulated the Soviet scientists on Sputnik I. He gave a brief history of the development of the United States satellite program and pointed to the separation of Project Vanguard from work on ballistic missiles. [The Department of State Bulletin, October 28, 1957, pp. 673, 674.]

October 14: The American Rocket Society presented to President Eisenhower a program for outer space development formulated after months of study. It proposed establishment of an Astronautical Research and Development Agency similar to the National Advisory Committee for Aeronautics and the Atomic Energy Commission, which would have responsibility for all space projects except those directly related to the military. The report contained a schedule of proposed space projects and pointed out the benefits which would accrue from them. [New York Times, December 5, 1957, p. 5.]

November 3: Sputnik II, carrying a dog, Laika, was launched by the Soviet Union. According to the Tass announcements, the "containers with apparatus" of this rocket-shaped satellite weighed 1,120 pounds, and it contained "instruments for studying solar radiation in the short wave ultraviolet and X-ray regions of the spectrum, instruments for cosmic ray studies, instruments for studying the temperature and pressure, an airtight container with an experimental animal (a dog), an air conditioning system, food and instruments for studying life processes in the conditions of cosmic space, measuring instruments for transmitting the results of scientific measurements to the earth, two radio transmitters operating on frequencies of 40,002 and 20,005 kilocycles and the necessary power sources." It had an initial orbit time of 103.7 minutes and a maximum altitude of 1,056 miles. [New York Times, November 4, 1957, p. 8. Ibid., March 27, 1958, p. 15.]

November 7: President Eisenhower in a radio and television address on science and security announced that scientists had solved the problem of re-entry and showed the nose cone of a missile which was intact after a flight through outer space. He announced the creation of the office of Special Assistant to the President for Science and Technology and the appointment of Dr. James R. Killian, president of the Massachusetts Institute of Technology, to the new post. [New York Times, November 8, 1957, p. 10.]

November 8: Secretary of Defense McElroy directed the Department of the Army to make preparations for launching a satellite with the Jupiter-C test rocket and thus supplement the existing Vanguard program. William M. Holaday, Assistant to the Secretary of Defense for Guided Missiles, was given authority for coordinating this project with the overall satellite program. [New York Times, November 9, 1957, p. 2.]

November 13: President Eisenhower, in a speech on future security, proposed adoption of a formula for decisions on undertaking space projects, which would include the following criteria:

"If the project is designed solely for scientific purposes, its size and its cost must be tailored to the scientific job it is going to do."

"If the project has some ultimate defense value, its urgency for this purpose is to be judged in comparison with the probable value of competing defense projects." [New York Times, November 14, 1957, p. 14.]

November 15: William M. Holaday, special assistant to the Secretary of Defense, was named Director of Guided Missiles by Secretary of Defense McElroy. Under terms of the Defense Department directive: "The Director of Guided Missiles will direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles." In his press conference Secretary McElroy disclosed that

the Department of Defense was thinking of establishing
tralized organization which would handle both outer spac
anti-missile-missile projects. [Department of Defense re
lease No. 1110-57. New York Times, November 16, 195
1, 2.]

November 21: The Rocket and Satellite Research Panel propo
creation of a National Space Establishment in the exe
branch of the Government. Under civilian leadership bu
nizant of defense requirements, this establishment would
out a unified program of space research in its own facilitie
by contract. [U. S. Congress. Senate. Committee on
and Astronautics, Compilation of materials on space and
nautics, March 27, 1958. No. 1, pp. 14-16.]

——— The board of directors of the National Advisory Comm
for Aeronautics authorized establishment of a special comm
on space technology. This committee would both supervis
help formulate a space research program and would be as
by specialized subcommittees. [Christian Science Monitor,
ary 11, 1958, p. 5.]

November 25: The Preparedness Investigating Subcommittee c
Senate Committee on Armed Services began extensive hea
on the Nation's satellite and missile programs. Approxim
70 experts appeared before the Subcommittee during the c
of these hearings, and written testimony was submitted by
200 others. [Congressional Record, January 23, 1958, p.
U. S. Congress. Senate. Committee on Armed Services.
paredness Investigating Subcommittee. Inquiry into sat
and missile programs. Hearings, November 25, 1957-Jan
23, 1958. Part 1.)]

December 4: The American Rocket Society's proposal for an A
nautical Research and Development Agency, which was pres
to President Eisenhower on October 14, 1957, was annou
Commander Robert C. Truax, president of the Society, s
that he felt $100,000,000 a year would be required at first fo
astronautical agency. [New York Times, December 5, 1957,

December 6: A mechanical failure in the propulsion system of a
guard rocket caused it to burst into flames two seconds after i
fired in an attempt by the Navy to launch a 6.4 inch test s
lite. [New York Times, December 7, 1957, pp. 1, 8. Ibid.,
cember 10, 1957, p. 7.]

December 10: A Directorate of Astronautics was established b
Air Force to manage and coordinate astronautical research
grams, including work on satellites and anti-missile wea
Brig. Gen. Homer Boushey was named to head the b
[New York Times, December 12, 1957, p. 7.]

December 13: The order creating a Directorate of Astronautics
suspended by William H. Douglas, Secretary of the Air F
as creation of such a group before establishment of the prop
Advanced Research Projects Agency was felt to be prema
[New York Times, December 14, 1957, p. 8.]

December 14: Maj. Gen. John B. Medaris, Commander of the A
Ballistic Missile Agency, in testifying before the Senate
paredness Investigating Subcommittee stated: "Because I

no responsibility to carry this out, I think I can say in open meeting that it is my personal opinion unless this country can command 1 million pounds of thrust by 1961, we will not be in pace * * * we will not be in the race." [U. S. Congress. Senate Committee on Armed Services. Preparedness Investigating Subcommittee. Inquiry into satellite and missile programs. Hearings, November 25, 1957–January 23, 1958. Part I, p. 562. Reported in New York Times, December 15, 1957, pp. 1, 42.]

1958

January 4: Sputnik I disintegrated. [New York Times, January 21, 1958, p. 14.]

——— The American Rocket Society and the Rocket and Satellite Research Panel issued a summary of their proposals for a National Space Establishment. Preferably independent of the Department of Defense, but in any event not under one of the military services, this establishment would be responsible for the "broad cultural, scientific, and commercial objectives" of outer space development. A timetable of the achievements necessary for attaining United States leadership in space technology was included in the document. [U. S. Congress. Senate. Special Committee on Space and Astronautics. Compilation of materials on space and astronautics, March 27, 1958. No. 1, pp. 17–19.]

January 9: In his State of the Union Message, President Eisenhower reported: "In recognition of the need for single control in some of our most advanced development projects, the Secretary of Defense has already decided to concentrate into one organization all antimissile and satellite technology undertaken within the Department of Defense." [New York Times, January 10, 1958, p. 8.]

January 12: President Eisenhower, in answering the December 10, 1957, letter of Soviet Premier Nikolai A. Bulganin regarding a summit conference and disarmament, proposed that the Soviet Union and the United States "agree that outer space should be used only for peaceful purposes." This proposal was compared with the 1948 offer of the United States to cease production of nuclear weapons and dedicate atomic energy to peaceful uses, an offer which was not accepted by the Soviet Union. [New York Times, January 13, 1958, p. 6.]

——— James H. Doolittle, chairman of the National Advisory Committee for Aeronautics, announced the authorization of a special committee on space technology on November 21, 1957. H. Guyford Stever was to head the committee. [Christian Science Monitor, January 11, 1958, p. 5.]

January 13: In his Budget Message to Congress, President Eisenhower stated that in his request: "Funds are provided for an expanded research and development effort on military satellites and other outer space vehicles and on antimissile missile systems, to be carried out directly under the Secretary of Defense." The budget for fiscal year 1959 showed that $340,000,000 in new obligational authority was being asked for the Advanced Research Projects Agency. No new authorizations were sought for the International Geophysical Year, but estimated obligations for earth satellite exploration of the upper atmosphere under this program were $6,189,834 for fiscal year 1958 and $21,000,000 for fiscal year 1959. [New York Times, January 14, 1958, pp. 18, 19. The Budget for Fiscal Year 1959, pp. 101, 169, 438.]

January 13: Secretary of Defense Neil H. McElroy, in testifying before the House Armed Services Committee, stated:

"Such long-range programs as the antimissile missile and the military satellite programs are in the research and exploratory development stages. They are important and must be pursued, but they must not distract us from the speedy development of our other missile systems. To handle them, I am establishing within the Department of Defense an Advanced Research Projects Agency, which will be responsible to the Secretary of Defense for the unified direction and management of the antimissile missile program and for outer space projects. I would expect to assign other special projects of this general nature to this agency from time to time in the future. [U. S. Congress. House of Representatives. Committee on Armed Services. Investigation of national defense missiles. Hearings, no. 71, p. 3961.]

January 14: Senator Lyndon B. Johnson in an address before Columbia Broadcasting System affiliates in Washington, D. C., urged the United States "to demonstrate its initiative before the United Nations by inviting all member nations to join in this adventure into outer space together." Growth of America's space research program and establishment of a government agency for its direction were also demanded by Johnson as part of the nation's answer to the Soviet challenge. [Congressional Record, January 16, 1958, pp. 551–553.]

January 16: Representative Carl T. Durham, chairman of the Joint Committee on Atomic Energy, announced the establishment of a Special Subcommittee on Outer Space Propulsion with Senator Clinton P. Anderson as chairman. [Congressional Record, January 16, 1958, p. D23.]

January 22: Nikita S. Khrushchev in a speech at Minsk, Byelorussia, stated that the Eisenhower proposal to dedicate outer space to peaceful purposes was an attempt of the United States to ban weapons it did not possess and to protect itself from those weapons which would harm its own territory. [New York Times, January 26, 1958, pp. 1, 2. Ibid., February 13, 1958, p. 8.]

January 23: Membership of the Special Subcommittee on Outer Space Propulsion of the Joint Committee on Atomic Energy was announced:

Senators: Clinton P. Anderson, chairman, Henry M. Jackson, Albert Gore, Bourke B. Hickenlooper, John W. Bricker.

Representatives: Chet Holifield, Melvin Price, James E. Van Zandt, James T. Patterson.

[Congressional Record, January 23, 1958, p. D41.]

January 23: Senator Clinton P. Anderson in a speech before Congress explaining his bill, S. 3117, proposed that control of the nation's outer space program be given to the Atomic Energy Commission. He stressed that such a decision would save needed time and would give control to an established civilian agency with extensive laboratories. Senator Anderson pointed out that nuclear propulsion should play an essential part in space technology. [Congressional Record, January 23, 1958, pp. 813–817.]

——— Senator Lyndon B. Johnson read a statement unanimously adopted by the Senate Preparedness Investigating Subcommittee at the conclusion of its hearings. Largely concerned with guided missile development, it stated that the Russian satellite program "demonstrates beyond question that the Soviet Union has the propulsive force to hurl a missile from one continent to another." The American program since the launching of Sputnik I was reviewed, and the report made seventeen recommendations for American security, including:

"Start work at once on the development of a rocket motor with a million-pound thrust."

"Accelerate and expand research and development programs, provide funding on a long-term basis, and improve control and administration within the Department of Defense or through the establishment of an independent agency." [Congressional Record, January 23, 1958, pp. 805–807.]

January 27: Hugh L. Dryden, director of the National Advisory Committee for Aeronautics, delivered a speech, Space Technology and the NACA, to the Institute of the Aeronautical Sciences. Stressing the importance of a well-planned and logical space program embracing both civilian and military uses, Dryden pointed to the organization of the NACA for both military and nonmilitary aeronautical research and reviewed the Committee's work in space research since World War II. He related the view expressed by the NACA at its January 16, 1958, meeting that the national space program should be under the joint control of the Department of Defense, the NACA, the National Academy of Sciences, and the National Science Foundation; in addition to research flights, the NACA would "coordinate and conduct research in space technology in its own laboratories and by contract in support of both military and nonmilitary projects." [Congressional Record, March 3, 1958, pp. A1902–A1904.]

January 31: The first American satellite, Explorer I, was launched by the Army using a modified Jupiter-C rocket. Weighing 30.8 pounds, the satellite and final stage rocket was 80 inches long and 6 inches in diameter. It carried 11 pounds of instruments for gathering data on skin and internal temperature, cosmic dust erosion, and cosmic rays; two radio transmitters of 108.03 and 108.00 megacycles sent this information to earth. The satellite had an initial orbit time of 114.5 minutes and a maximum altitude of 1,587 miles. Its orbit was inclined at a 34-degree angle to the equatorial plane. Explorer I had an expected lifetime of several years. [New York Times, February 1, 1958, p. 7A. Ibid., March 27, 1958, p. 15.]

February 3: Soviet Premier Nikolai A. Bulganin in a letter to President Eisenhower stated that the Soviet Union "is ready to examine also the question of the intercontinental rockets if the Western powers are willing to reach agreement to ban atomic and hydrogen weapons, to end tests thereof, and to liquidate foreign military bases in other nations' territories. In that case, an agreement on the use of outer space for peaceful purposes only would unquestionably meet no difficulties." [New York Times, February 4, 1958, p. 8.]

——— Scientists at the California Institute of Technology reported that initial data from Explorer I showed that cosmic radiation on its orbit did not exceed twelve times the amount on earth and thus appeared to pose no great threat to travel in this region. In addition, no positive evidence of encounter with meteoritic particles had been found. [New York Times, February 4, 1958, pp. 1, 16.]

February 4: Republican Congressional leaders were informed that President Eisenhower had directed James R. Killian, Jr., to study and make recommendations on the governmental organization of the nation's space and missile program. [New York Times, February 5, 1958, pp. 1, 12.]

February 5: The second trial firing of a Vanguard test satellite failed as defects in the first-stage engine control system caused the rocket to veer to the right and break in two about sixty seconds after launching. The rocket was destroyed by the range safety officer at the Air Force Missile Test Center, Cape Canaveral, Florida. [New York Times, February 5, 1958, pp. 1, 12. Ibid., February 6, 1958, pp. 1, 12.]

February 6: The Senate passed S. Res. 256, creating a Special Committee on Space and Astronautics to frame legislation for a national program of space exploration and development. [Congressional Record, February 6, 1958, pp. 1551–1553.]

February 7: The Advanced Research Projects Agency was established by the Department of Defense, and Roy W. Johnson, a vice president of General Electric Company, was appointed by Secretary of Defense McElroy as its director. ARPA was placed in charge of the nation's outer space program including the development of military space weapons and was made responsible for anti-missile missile projects. William H. Holaday, Director of Guided Missiles, was to transfer responsibilities in these fields to Mr. Johnson. [New York Times, February 8, 1958, pp. 1, 8; Dept. of Defense news release No. 109–58.]

February 10: The following Senators were named to the Senate Special Committee on Space and Astronautics: Lyndon B. Johnson, Styles Bridges, Richard B. Russell, Leverett Saltonstall, Clinton P. Anderson, Bourke B. Hickenlooper, Theodore Francis Green, Alexander Wiley, John L. McClellan, Karl E. Mundt, Warren G. Magnuson, John W. Bricker, Stuart Symington. [Congressional Record, February 10, 1958, p. 1636.]

——— Senator Michael J. Mansfield urged the members of the North Atlantic Treaty Organization to take the initiative in exploring space on a cooperative basis. Other nations who wished "to participate in good faith" would be included in this international undertaking. Senator Mansfield also recommended that the United States should propose extending the International Geophysical Year "into a decade of worldwide scientific cooperation." [Congressional Record, February 10, 1958, pp. 1669–1674.]

February 11: The Supplemental Defense Appropriation Act, 1958, stated: "The Secretary of Defense is authorized to transfer not exceeding $10,000,000, to remain available until expended, from any appropriations available to the Department of Defense for the current fiscal year for such advanced research projects as he may designate and determine. * * *" It was provided that current fiscal year appropriations for related programs might be transferred to and merged with this appropriation, and that amounts of this appropriation might be transferred to other appropriations for advanced research under the Department of Defense. [Supplemental Defense Appropriation Act, 1958, Public Law 322, 72 Stat. 7.]

February 12: Public Law 325 gave the Department of Defense authority to participate in advanced research projects, including space projects. Section 7 read in part:

"The Secretary of Defense or his designee is authorized to engage in such advanced projects essential to the Defense Department's responsibilities in the field of basic and applied research and development which pertain to weapons systems and military requirements as the Secretary of Defense may determine after consultation with the Joint Chiefs of Staff; and for a period of one year from the effective date of this Act, the Secretary of Defense or his designee is further authorized to engage in such advanced space projects as may be designated by the President." [Public Law 325, 72 Stat. 13, 14.]

February 13: The National Society of Professional Engineers proposed establishment of a Federal Space Exploration Commission to undertake and have unified responsibility for a program of space exploration. The commissioners would be appointed by the President, and the civilian commission "would be able to give the military services adequate opportunity for rocket and missile development—as consistent with the defining of service roles at the highest policy level." [U. S. Congress. Senate. Special Committee on Space and Astronautics. Compilation of materials on space and astronautics, March 27, 1958. No. 1, pp. 20–22.]

February 14: Basic Objectives of a Continuing Program of Scientific Research in Outer Space, a report by the Technical Panel on the Earth Satellite Program of the United States National Committee for the International Geophysical Year was published. The report proposed a program of space research extending beyond the International Geophysical Year. It outlined the technical investigations which should be made by sounding rockets, lightweight and advanced satellites, lunar probes, planetary and interplanetary research, and manned space flight, and gave a detailed description of the scientific information which could be gained from these experiments. [Science, April 11, 1958; U. S. Congress. Senate. Special Committee on Space and Astronautics. Compilation of materials on space and astronautics, March 27, 1958. No. 1, pp. 23–44.]

February 16: Airman Donald G. Farrell completed a week's isolation in a space cabin at Randolph Air Force Base in an experiment testing atmospheric equipment for space flight and the effects of this artificial environment on man's working ability. [New York Times, February 16, 1958, p. 26; Ibid., February 17, 1958, pp. 1, 16.]

February 17: In a letter to Soviet Premier Nikolai A. Bulganin, President Eisenhower repeated his plea for the dedication of outer space to peaceful uses. Denying that this proposal was intended "to gain strategic advantages for the United States," he stressed the urgency of dealing with outer space before its use for military purposes had, like nuclear weapons, advanced to the point where complete international control was almost impossible. [New York Times, February 18, 1958, p. 8.]

February 20: Senator Lyndon B. Johnson was elected chairman of the Senate Special Committee on Space and Astronautics. [Congressional Record, February 20, 1958, p. D128.]

February 21: According to the Soviet Geophysical Year Committee, the Russians fired to a 294-mile altitude a rocket containing 1½ tons of instruments for measuring the ion composition of the atmosphere, electronic temperature, air pressure, encounters with micrometeorite particles, the ultraviolet sector of the spectrum, and the concentrations of free electrons in the ionosphere and of positive ions. [Christian Science Monitor, April 12, 1958, p. 2.]

March 5: Explorer II was launched but did not go into orbit because of failure of the final rocket to ignite. Unable to achieve the required velocity, it re-entered the atmosphere and was probably burned up before falling into the Atlantic Ocean. [New York Times, March 6, 1958, pp. 1, 10. *Ibid.*, March 7, 1958, pp. 1, 8.]

—— H. Res. 496, passed by the House of Representatives, established a Select Committee on Astronautics and Space Exploration to investigate the problems of outer space and to submit recommendations for the control and development of astronautical resources. Congressmen appointed to the Committee were: John W. McCormack, chairman, Overton Brooks, Wayne L. Hays, Leo W. O'Brien, Lee Metcalf, William H. Natcher, B. F. Sisk, Joseph W. Martin, Jr., Leslie C. Arends, Gordon L. McDonough, James G. Fulton, Kenneth B. Keating, Gerald R. Ford, Jr. [Congressional Record, March 5, 1958, pp. 3019, 3020.]

—— The following appointments to the Advanced Research Projects Agency were announced by the Department of Defense: Rear Admiral John E. Clark, USN, Deputy Director; Lawrence P. Gise, Director, Program Control and Administration; Lambert L. Lind, Special Assistant to the Director. [Department of Defense news release No. 197–58.]

March 7: George J. Feldman, New York attorney, was appointed director and chief counsel of the House Select Committee on Astronautics and Space Exploration. [New York Times, March 8, 1958, p. 20.]

March 9: Harold E. Stassen, in an address on foreign policy, urged the United States "to express willingness to join in a United Nations Space Development Agency which would endeavor as a United Nations project to send the first man into space and to send the first inspection photographic satellite around the earth." [Washington Post and Times Herald, March 10, 1958, pp. A1, A6.]

March 15: In a Foreign Ministry statement the Soviet Union proposed that banning the use of outer space for military purposes, as suggested by President Eisenhower, be coupled with the liquidation of foreign military bases on the territories of other countries, especially in Europe, the Middle East, and North Africa. An international program for space research would be established under the control of the United Nations and each country would pledge to launch rockets only under this program. A new United Nations agency for international cooperation in research on cosmic space would develop this space program, continue the International Geophysical Year research program on a permanent basis, and serve as a clearing house and coordinator for national research. [New York Times, March 16, 1958, p. 34.]

March 17: Vanguard I, a test sphere weighing 3.25 pounds, was launched by the Navy at Cape Canaveral, Florida. The 6.4 inch satellite carried two radio transmitters, one of which was powered by six solar batteries. Vanguard I had a maximum altitude of 2,466 miles and a five to ten year expected lifetime. [New York Times, March 18, 1958, pp. 1, 14. Ibid. March 27, 1958, p. 15.]

—— An experiment testing the behavior of crews under conditions of long confinement was concluded at Wright Air Development Center, as five Air Force officers ended a five day simulated space flight. [New York Times, March 18, 1958, p. 16.]

March 18: The Institute for Defense Analyses, a nonprofit corporation serving the Department of Defense, announced the formation of an Advanced Research Projects Division and the appointment of Dr. Herbert F. York as its head. In this capacity Dr. York would serve as Chief Scientist for the Defense Department's Advanced Research Projects Agency. He had been director of the University of California Radiation Laboratory at Livermore, California. [Department of Defense news release No. 250–58; New York Times, March 19, 1958, p. 1.]

March 24: Senator Lyndon B. Johnson, chairman of the Senate Special Committee on Space and Astronautics, made the following staff appointments: Glen P. Wilson, coordinator of technical information; Eilene Galloway, special consultant. [Washington Post and Times Herald, March 25, 1958, p. A7.]

March 25: Senator Lyndon B. Johnson announced the following appointments to the Senate Special Committee on Space and Astronautics: Edwin L. Weisl, consulting counsel; Cyrus R. Vance, consulting counsel; Homer Joe Stewart, scientific consultant. [Congressional Record, March 25, 1958, pp. 4605, 4606.]

March 26: President Eisenhower in a brief statement made public the President's Science Advisory Committee's report, Introduction to Outer Space; an Explanatory Statement. This report set forth the basic factors making the advancement of space technology a national necessity and explained to the nontechnical reader the principles and potentialities of space travel. The many uses of space technology for scientific and military purposes were summarized, and a timetable for carrying out these objectives was included. [Congressional Record, March 26, 1958, pp. 4909–4912; U. S. Congress. Senate. Special Committee on Space and Astronautics. Compilation of materials on space and astronautics, March 27, 1958. No. 1, pp. 45–53.]

—— Explorer III was launched by the Army and followed an unplanned orbit, which caused it to pass closer to the earth and probably lessened its life expectancy. It gathered the same data as Explorer I, but its high powered transmitter recorded cosmic ray data on a tape recorder which played back the information on signal to ground recording stations. Weighing 31 pounds, its antenna system differed from that of Explorer I. [New York Times, March 27, 1958, pp. 1, 15. Christian Science Monitor, March 27, 1958, p. 3.]

March 27: President Eisenhower gave his approval to the plans for outer space exploration announced by Secretary of Defense Neil H. McElroy. The Advanced Research Projects Agency was to undertake several space projects including the launching of earth satellites and lunar probes. The Air Force Ballistic Missile Division was authorized by ARPA to carry out three lunar probes with a Thor-Vanguard system, and one or two lunar probes utilizing the Jupiter–C rocket were assigned to the Army Ballistic Missile Agency. A mechanical ground scanning system for lunar investigations was to be developed by the Naval Ordnance Test Station, China Lake, California. [New York Times, March 28, 1958, p. 3.]

—— Charles S. Sheldon II was named assistant director of the House Select Committee on Astronautics and Space Exploration.

April 2: President Eisenhower in a message to Congress proposed the establishment of a National Aeronautics and Space Agency into which the National Advisory Committee for Aeronautics would be absorbed. This agency was to have responsibility for civilian space science and aeronautical research. It would conduct research in these fields in its own facilities or by contract and would also perform military research required by the military departments. Interim projects pertaining to the civilian program which were under the direction of the Advanced Research Projects Agency would be transferred to the civilian space agency. A National Aeronautics and Space Board, appointed by the President and composed of eminent persons outside the Government and representatives of interested Government agencies (with at least one member from the Department of Defense), was to assist the President and the director of the National Aeronautics and Space Agency. [New York Times, April 3, 1958, p. 14; Congressional Record, April 2, 1958, pp. 5489, 5490.]

—— The original budget request of $340,000,000 in new obligational authority for the Advanced Research Projects Agency for fiscal year 1959 was raised to $520,000,000 for advanced research projects in a letter from the Director of the Bureau of the Budget, Maurice H. Stans, which was transmitted to Congress by President Eisenhower. [Amendments to budget for fiscal year 1959 involving increases for Department of Defense military functions, House Document 364, April 2, 1958.]

April 3: In a message to Congress on the organization of the Nation's Defense Establishment, President Eisenhower recommended creation of the position of Director of Defense Research and Engineering, which would have a higher rank and replace the present Assistant Secretary of Defense for Research and Engineering. Among his other responsibilities, the Director would supervise the research activities of the Advanced Research Projects Agency. [U. S. Congress. House of Representatives. Message from the

President of the United States transmitting recommendations relative to our entire Defense Establishment. Document No. 366.]

April 5: S. Fred Singer, physics professor at the University of Maryland, was named head, scientific evaluation consultants of the House Select Committee on Astronautics and Space Exploration. [Washington Star, April 6, 1958, p. A21.]

April 13: Sputnik II plunged to earth. [Washington Post and Times Herald, April 15, 1958, p. A3.]

April 14: The proposal for a National Aeronautics and Space Agency drafted by the Bureau of the Budget was contained in the following congressional bills:

- S. 3609, Senator Lyndon B. Johnson
- H. R. 11881, Representative John W. McCormack
- H. R. 11882, Representative Leslie C. Arends
- H. R. 11887, Representative Harry G. Haskell, Jr.
- H. R. 11888, Representative Kenneth B. Keating

[Congressional Record, April 14, 1958, pp. 5631, 5661.]

April 15: The Select Committee on Astronautics and Space Exploration of the House of Representatives opened hearings on outer space as a step toward formulating a national space program. During the hearings, which continued for three weeks, military and scientific experts discussed the scientific development of outer space and offered recommendations on the establishment of a civilian space agency. [Washington Post and Times Herald, April 15, 1958, p. A17.]

April 22: Hearings on proposed reorganization of the Department of Defense opened before the House Committee on Armed Services. [New York Times, April 23, 1958, pp. 1, 22.]

April 27: An article in Pravda on Soviet satellite findings reported that Laika's heartbeat had taken three times as long as expected to return to normal, once its acceleration due to the satellite's speed had ceased. Weightlessness affecting the nerve centers was suggested as the cause. The Soviet report disclosed that the density and temperature of the atmosphere at a given altitude were not uniform, and that cosmic ray intensity was 40 percent greater at 400 miles than at 135 miles. The article also contained information on the density of electrons and reported 1 mysterious 50-percent increase in radiation intensity. [New York Times, May 2, 1958, pp. 1, 16.]

April 28: An instrumented Vanguard satellite was launched by the Navy, but due to failure of the third stage rocket, did not attain the speed required to orbit around the earth. [New York Times, April 29, 1958, pp. 1, 16.]

May 1: Scientific findings from the 2 Explorer satellites disclosed an unexpected band of high-intensity radiation extending from 600 miles above earth to possibly an 8,000-mile altitude. The radiation, which was described by Dr. James A. Van Allen as "1,000 times as intense as could be attributed to cosmic rays," was believed to come from ionized gas; Dr. Van Allen felt lead shielding 1 millimeter thick would reduce this radiation about 90 percent. The Explorers also showed that the atmosphere at 220 miles was denser than predicted, that satellite temperatures would not be too great for humans, and that cosmic dust was only a small hazard to space travel. [New York Times, May 2, 1958, pp. 1, 6.]

May 6: The Senate Special Committee on Space and Astronautics opened hearings on the administration's proposal for a National Aeronautics and Space Agency. [New York Times, May 7, 1958, p. 15.]

May 15: Sputnik III was launched by the Soviet Union. According to the Tass announcements, the new satellite is cone shaped, 11 feet 9 inches long and 5 feet 8 inches wide at the base. It weighs 2,919 pounds including 2,129 pounds of instruments, to form a complete geophysical laboratory. Instruments will measure pressure and composition of the earth's atmosphere at high altitudes, the concentration of positive ions, the magnitude of electrical charges in the atmosphere and the intensity of the earth's electrostatic field, the strength of the earth's magnetism, solar radiation, cosmic rays, micrometeorites, and temperatures inside and outside the satellite. Radio signals are broadcast on 20.005 megacycles, and the equipment includes both electrochemical and solar batteries. It had an initial orbit time of 106 minutes, and a maximum altitude of 1,168 miles (New York Times, May 16, 1958, p. 1, 8, and 9).

APPENDIX 8

THE ORGANIZATION OF CONGRESS FOR THE CONSIDERATION AND SUPERVISION OF ASTRONAUTICS

George B. Galloway, Senior Specialist in American Government, Legislative Reference Service, Library of Congress, May 12, 1958

When the Legislative Reorganization Act of 1946 streamlined the standing committees of Congress and redefined their jurisdictions, it was not anticipated that the advance of science and the launching of manmade satellites into outer space would give rise to a new field of congressional inquiry and action. But the introduction in both Houses of Congress of legislative proposals to establish a new Space Agency in the executive branch of the Government, to create a Department of Science and Technology, and other bills for related purposes, raises the question as to how Congress should organize itself to deal with this new situation.

These amazing technological developments present Congress with the problem of devising appropriate internal machinery or of adapting existing mechanisms, that will enable it efficiently to consider proposed legislation in this new field of astronautics and to exercise continuous watchfulness of the execution of the laws that may be enacted in this novel area. The result desired to be achieved by changes in, or by additions to, the existing machinery of Congress may be defined as the establishment of a scheme of arrangements that will permit Congress to perform its traditional legislative and supervisory functions effectively in the space age upon which the world is now entering.

The realization of this purpose will be conditioned by several affecting circumstances. One of them is the expectation that the exploration of outer space will have both civilian and military aspects and implications. On the civilian side, for example, scientific research may well facilitate weather prediction and perhaps weather control